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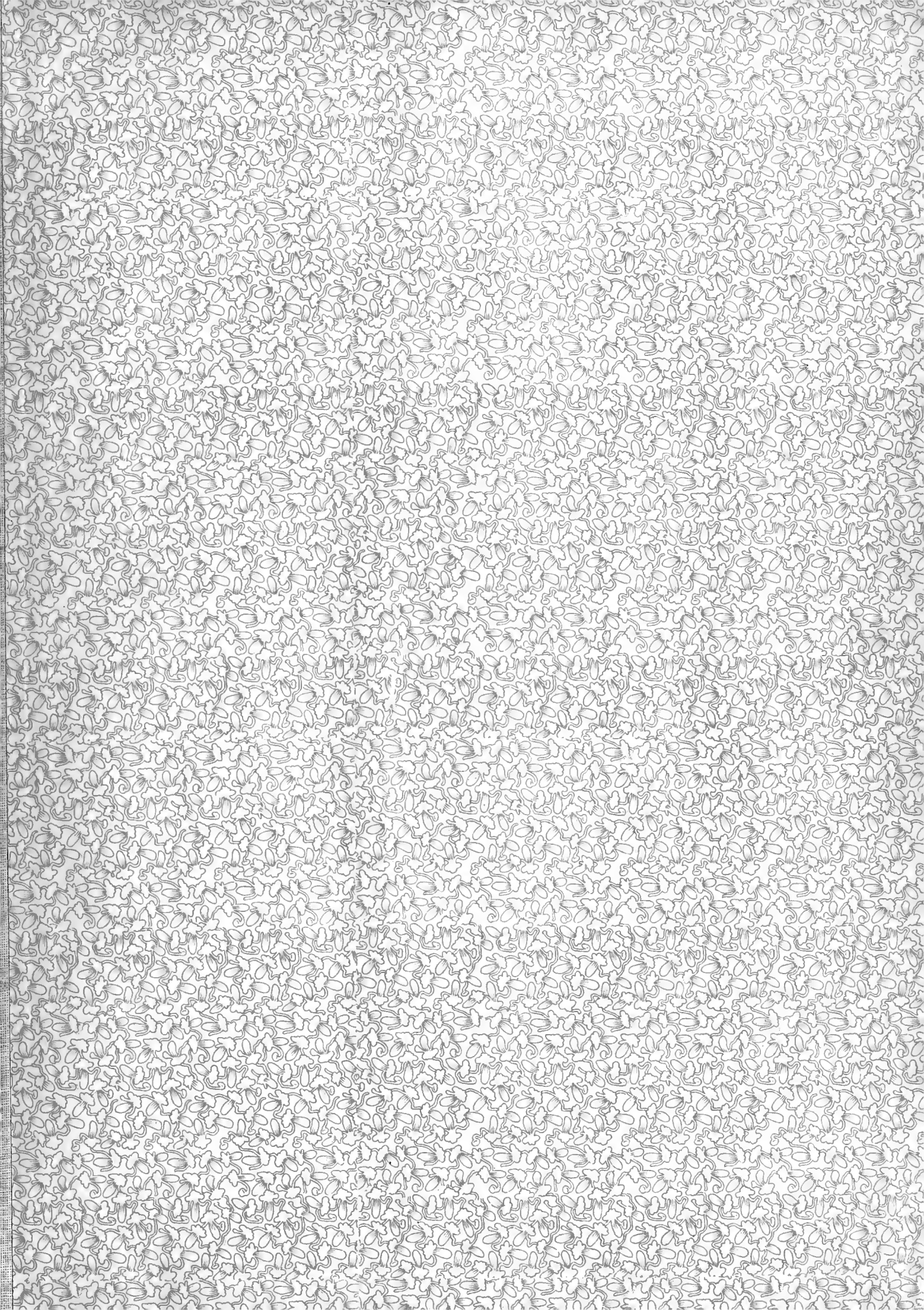
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JULY TO DECEMBER

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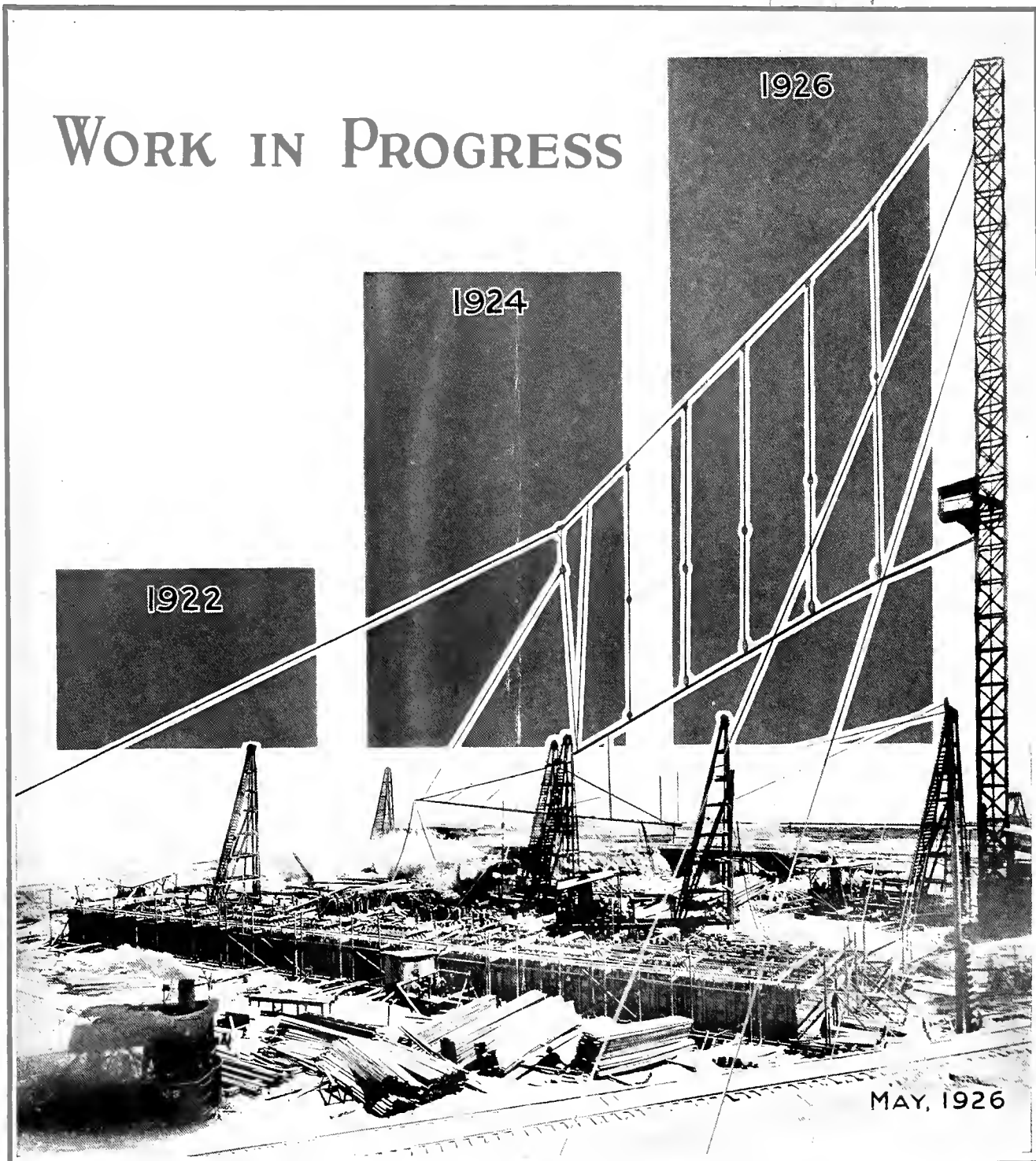
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# Journal of Electricity

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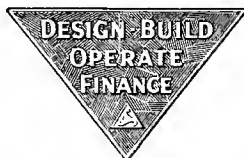
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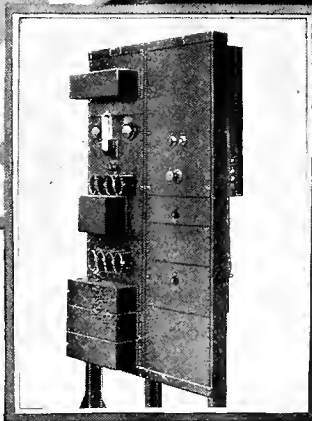
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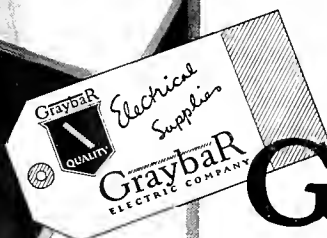


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## Convention Coverage

BACK from the conventions have come the delegates. The round of regular activities has been resumed. And if left to memory alone much of the important thought presented at the conventions might well be lost in the resumption of ordinary tasks requiring vigorous attention.

But the recording of the conventions shall not be left to memory alone. The ideas and thoughts presented in the many convention sessions are of real value to the industry and should be used wherever applicable. Moreover, not every member of the industry was so situated as to have been able to attend these conventions. A written record of what was said, what was demonstrated, what occurred, is of vital use, therefore, to both those who attended and those who could not attend.

Three representatives of the Journal of Electricity were sent to the Pacific Coast Electrical Association convention at Los Angeles June 8-11. They have brought back a report which covers every important activity of the convention and digests succinctly every notable thought or idea presented by the prominent speakers there.

At the convention of the Northwest Electric Light & Power Association, in Spokane June 14-17 the Northwest editor of the Journal was joined by two representatives from the main office to gather a similar report for publication.

Both stories will be found in the columns of this number of the Journal of Electricity. Because these reports reflect the advancement of the industry and present its ideals and aspirations they should serve as a continual source of inspiration to all workers within the industry.

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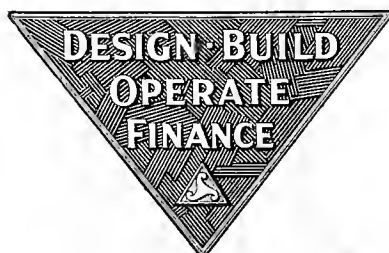


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# EDITORIAL

## *Industry's Selling Problem Is Keynote of Two Conventions*

THE stock phrase to employ in describing any convention is that "it was the most successful in the history of the organization" whether or not it means anything. In prefacing the story of the two conventions recently held in the West—those of the Pacific Coast Electrical Association and the Northwest Electric Light and Power Association—nothing so hackneyed is appropriate. In truth, beyond the interest shown in both the general and group sessions, the exceptionally large attendance, and the degree of thought and care shown in the preparation of papers, was a startling unanimity of thought shown by the recognized leaders of the industry in the emphasis placed upon merchandising as the one paramount issue before the central stations today.

THIS is interesting—even more, it is of great importance in that it heralds an awakening on the part of the higher executives to the fact that they have a marketing problem, even as men in other commercial pursuits. It was pointed out that American industry and the American home are but ten per cent electrified. This means that the market hardly has been scratched and that the electrical industry has before it the greatest selling job in the world today.

IT is refreshing to note that this problem has been recognized and acknowledged. This is the first step

toward its ultimate solution. Now, what are the other steps?

IT would appear at first blush that there is required a new type of man in the ranks of central-station personnel—the merchandiser. His duties will consist in building the right kind of load through merchandising the apparatus and appliances that consume electrical energy. His methods will be those that characterize the successful merchant, a line of endeavor in which few power company-executives have had any experience.

TO the man heading such departmental activity should be accorded a weight and importance in the counsels of the company that will place him on a par with the men in charge of engineering, operation, accounting, and public relations. As to compensation, competent merchandisers will command a rate of pay in keeping with the market price for such labor, and the central stations who take their marketing problem seriously will be glad to pay the cost of getting satisfactory results, even though the pay scale may be higher than that obtaining among the rank and file of other departments.

IN any event, if the two conventions have done nothing more than bring out in the open the weakness in the central-station sales structure, they will have more than justified all the time, effort and money that have been expended.

### There Is Competition to Power Distribution

IT is admitted, especially by the industry itself, that electricity finds its way into the daily lives of everybody in one way or another. Since the men of the industry have discovered that interesting fact they are prone to take for granted that those outside of the industry ought to manifest a consuming interest in electrical affairs as a matter of course. Power, and by this is meant electrical power, of course, is a comparatively small item in manufacturing costs; in some cases it represents only two or three per cent of the whole. It is not surprising, therefore, that those engaged in Angora goat culture, for instance, are concerned chiefly with the technique of their craft rather than with the electrical energy that in small part contributes to their welfare.

Nevertheless, there is a common ground and a common problem that concerns every conceivable industry, regardless of how far apart they may be in their varied products. By this is meant the selling problem, the marketing problem which, like the poor, is always with us. There is need for a sales organization, national and local, through which periodic conferences might be held for the purposes of expounding the problems of marketing, discussing methods of preventing waste, and promoting efficiency.

The men of the electrical industry are beginning to discover that they, too, have a selling problem, that their service is not a public necessity but rather a public convenience, that they must meet in competition many substitutes that are offered for performing a similar service. The experienced merchant regards with good-natured amusement the efforts of the central stations to adapt themselves to the new task of building up the demand for their services through the so-called "merchandising" of appliances. He probably will continue in this attitude until merchants of skill and experience are added to the staff of the commercial departments of the central stations and apply accepted merchandising methods to the creation of more and greater current consumption through the increased use of electrical servants. Nationally but ten per cent of the existing market for electrical service has been satisfied. It will take the best merchandising effort to correct this condition.

### Technical Job Well Done

A job well done is a lasting monument to the conscientious efforts of the men who do it. The Technical Section of the Pacific Coast Electrical Association is building for itself such a monument, although that fact is purely incidental to the systematic accomplishment of the objectives of that organization. Efficiency, dispatch, thoroughness and tenacity are some of the important attributes featuring the works of the nine major committees and the many subcommittees in their efforts to make possible the more economic generation, transmission and distribution of electrical energy.

In substantiation of these facts it is necessary but to refer to the 79 pages in the May 15 issue of the Journal of Electricity carrying part of the annual reports of the Technical Section. Elsewhere in this issue appears a condensed outline of the convention sessions of the section and this, too, reflects the same air. In short the section's progress under leaders of the past presents a challenge to leaders of the future.

### Lessons from the Two Recent Conventions

ACHIEVEMENTS of the electric light and power industry in the Pacific Coast states during the past twelve months have been made a matter of permanent record as the result of the two important sectional conventions just held—those of the Pacific Coast Electrical Association in Los Angeles and the Northwest Electric Light and Power Association in Spokane.

So much of unusual interest transpired at the two conventions that limitations of space prevent more than passing note here. The major portion of this issue is devoted to complete reports of the transactions of the various sessions. However, from the standpoint of programs both meetings deserve special mention. Not only were they addressed by men of national importance in the electrical industry but leaders from other industries were called in to discuss phases of business in which electrical men are vitally interested. The registration at both conventions was notable, that at Los Angeles exceeding any previous meeting of the P.C.E.A. All sessions were well attended. In keeping with the expressed wishes of William A. Baurhyte and Lewis A. Lewis, the respective presidents, both conventions were business conventions, and those in attendance saw to it that pleasure was confined to those times provided on the programs for that purpose.

To those members of the industry who were not so fortunate as to attend the conventions this issue is dedicated. A careful study of the reports presented in this issue will give them at least an intimate cross-section of the present trend of our business. Those who did attend will find the reports printed herein a stimulus to the recollection of the many accomplishments of the conventions and a permanent record of two meetings fruitful in concrete benefits to the electrical industry on the Pacific Coast.

### Nights of the Bath

FOR a while the bathroom remained the only room in the house not yet exposed to public view upon the stage. But no more! The bathroom has been given its place in the spotlight.

Small wonder, when it is considered what beautiful bathrooms are available nowadays, with plumbing manufacturers vying with each other to produce more charming bathrooms, not only in elaborate sales rooms but in equally elaborate advertising pages.



Nor has the bathroom escaped the attention of the electrical fraternity. Special fixtures to harmonize with the morning shave, immersion heaters for the shaving mug itself, electric water heaters and sundry other appliances have been offered by the industry to make the bathroom a place of everyday pleasure instead of a Saturday night saturnalia. Yet the fact remains that many homes are not equipped for the one real joy of electricity in the bathroom, that of electric heat.

If other means of heating are preferred for other rooms of the house, electric heat is often the only sensible heat for the bathroom. From the standpoint of sanitation, convenience, and quality, electric heat in the bathroom has no real rivals. Where no other electric heating is used in the house, such heating of the bathroom occupies an important place as a load builder at lighting rates.

As an agent to introduce the superior qualities of electric heating to the householder, an electric heater in the bathroom conceivably may be the entering wedge toward the more complete electrification of the home. Certainly there is an opportunity for any live electrical merchandiser to sell for the bathroom of every wired home not only the small room heater but an installed wall heater of an efficient and tried type. When the wall type is introduced electric heat of a similar type will be desired for bedrooms, kitchen, and finally living rooms. Truly, an electric heater in the bathroom is worth two on the shelf.

#### Summer Markets for Appliances

FOR that summer slump, traditional excuse for a general let-down in energy, prescribed by climate, and nursed along on so many rounds of golf daily, mayhap a swim, a trip to the mountains—for that summer slump, if such there be, try electrical merchandising. This one field of activity promises to hold some reward in even the warmest of localities.

This statement may seem in contradiction to all accepted theories as to summer business conditions. Electrical merchandising, like other forms of merchandising, is said to be afflicted with spring fever along about May and to continue to moon until Labor Day, a signal for business to pick up again. Yet these are but arbitrary periods. Like the equator, which also suffers from the heat, it is said, they are imaginary lines.

June-bride gift campaigns have punctured the idea that June is a month in which electrical appliances may be slow in moving. With concentration on the idea of electrical appliances for the June-bride gift, the month now is considered one of the best all 'round appliance-selling periods on the calendar.

One company blasted the summer slump gloom with a concentrated and very effective campaign on electric fireless cookers last year. By making its appeal to the desire of the average housewife to do as little cooking in the summer as possible, and stressing the advantages of the cooker in question in taking warm food on summer outings, this com-

pany broke records with its summer appliance campaign.

The virtue of electrical merchandise lies in its usefulness, convenience, and beauty, and there is no season of the year in which these qualities are not in demand in merchandise. The electric way of preparing food, on the table, without heat or trouble, has a particular appeal during summer. If electric heating appliances do not sell well in hot weather, then certainly the refrigerator will.

Business is for those who go after it in earnest, and summer, winter, fall or spring, will reward him who seeks it in the measure in which he applies himself to it. And for summer, especially, try electrical merchandising.

#### The Contractor Helps Himself

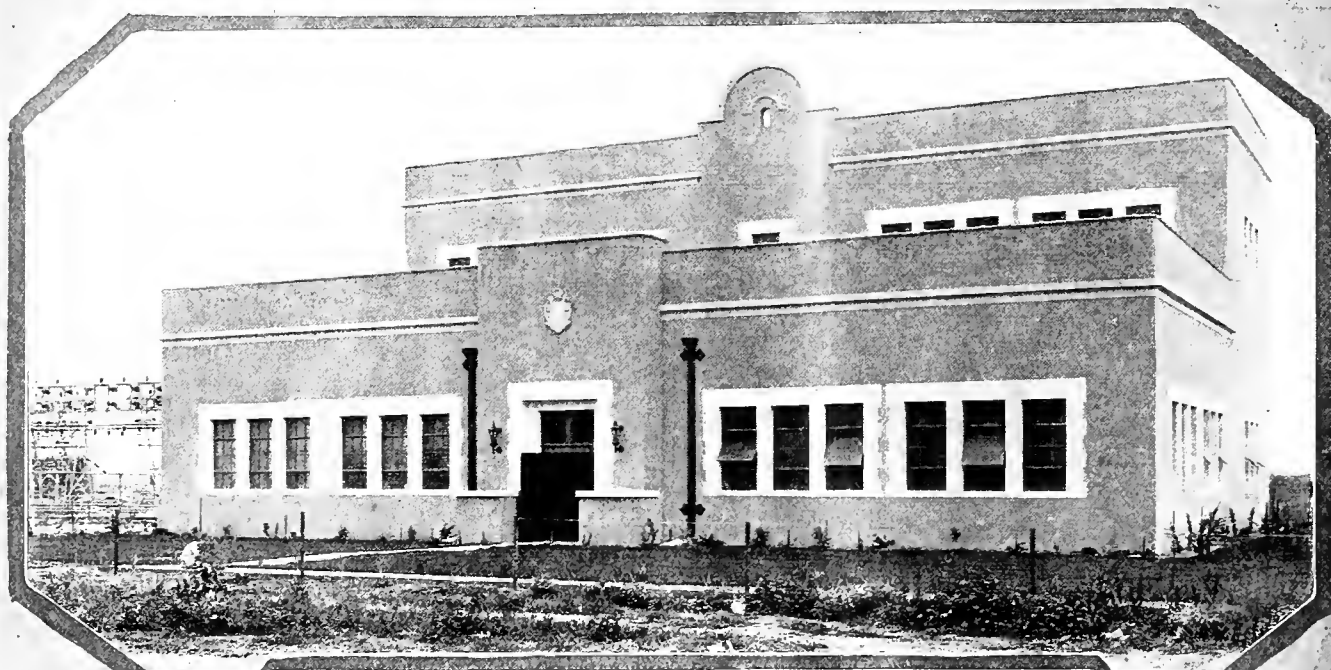
GOING are the days when the electrical contractor-dealer sought to hover under the protective wing of the central station. The electrical contractor-dealer, like many another artisan, has decided to take his fate in his own hands and to prosper along with his fellows of the craft by co-operating with them. This undoubtedly is a good sign.

There was a time not long ago when many electrical contractor-dealers looked to the central station as somehow responsible for their future. With a sort of "you can't get along without me, so be sure to look after me" feeling, if not expressed, at least implied, the business of being an electrical contractor was not all that it might be. Such an attitude weakened the self-respect of the contractor-dealer. Anyone under implied or actual charity always suffers in self-respect.

The electrical contractor-dealer now knows that, whether or not the central station can get along without him, he certainly ought to get along by himself, as nearly independent of the central station as he can be under all conditions. So he has turned to his brother electrical contractor-dealers instead of to the central station. Instead of looking for some sort of providence in the form of central-station subsidy to support him while he knifed his competitor for every electrical job, the same man has seen the light of the aged truism, "if we don't hang together, we'll all be hanged separately."

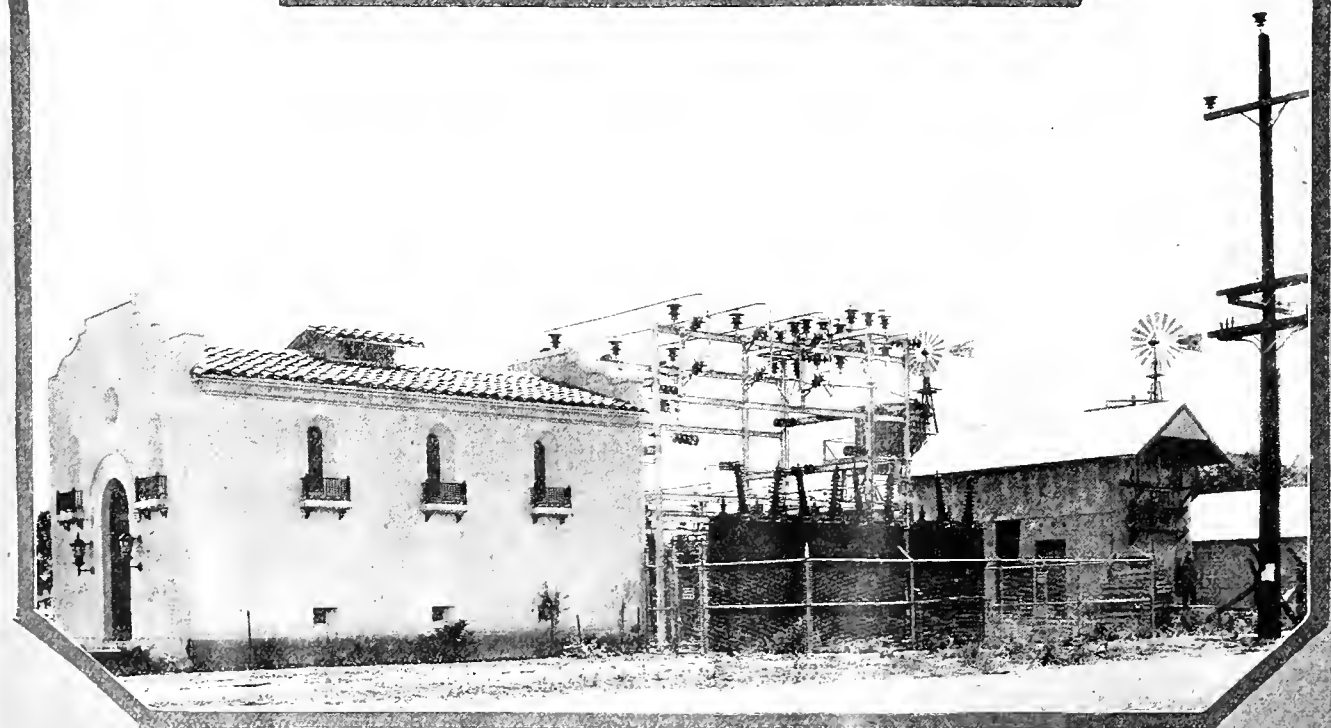
The Electragists of southern California have made notable success of their co-operative work. They have gone a step farther in independence and self-determination than possibly any other section. Not only do they co-operate; these Electragists now compile a monthly record of the number of appliances they have sold in order to show to the central station and to the world that their place in the picture is not a negligible one by any means.

The old "gimme" is going. In its stead is coming forth a self-respecting group of contractor-dealers, working together in harmony and proving that they are doing a notable service to the central stations that no one can gainsay.



**S**UBSTATION improvements and additions in the Salinas Valley, Calif., territory are keeping pace with those in other progressive districts as is indicated in the accompanying cuts. Above is shown the new Salinas substation of the Coast Valleys Gas & Electric Company. The building houses a 10,000-kva. synchronous condenser, switching equipment for the local distribution, and control boards for this and for the outdoor 66 and 110-kv. switching station. This station is destined to be the main switching center and power source for that entire section of the country. A 110-kv. line is under construction that soon will afford a direct tie with the Sierra & San Francisco hydroelectric plants.

**G**ONZALES substation of the Coast Valleys Gas & Electric Company is shown below and represents about the latest thing in unattended distribution substation. The pleasing appearance of the new substation contrasts favorably with the replaced and obsolete sheet-metal station appearing at the extreme right and which shortly is to be torn down. Landscaping also is under way.

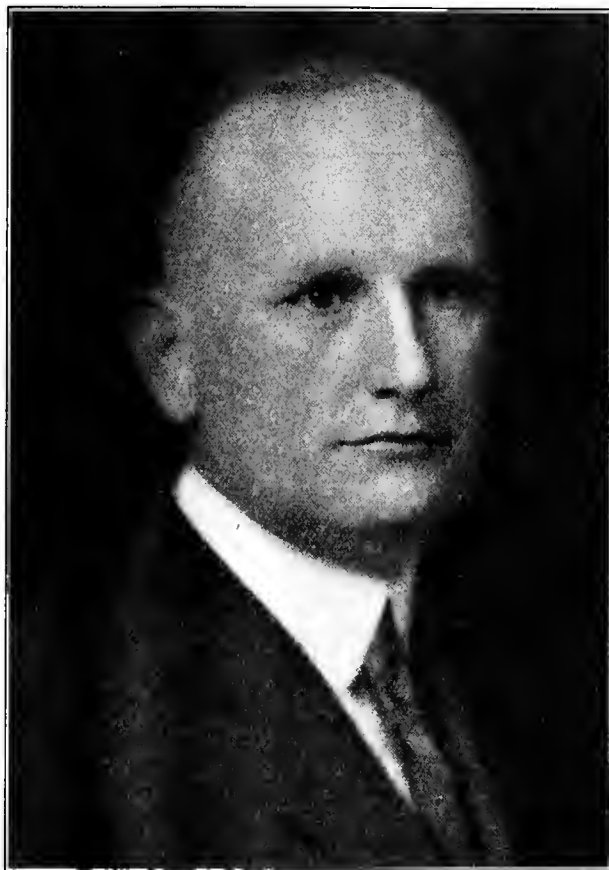


# Public Relations and Sales Are Themes of P.C.E.A. Convention

**T**HAT the structure of the electrical industry, which is based upon good engineering, scientific accounting, a sound merchandising policy, efficient operation and proper public relations, exists only for the rendering of a greater and more satisfactory service to the public was the theme of the tenth annual convention of the Pacific Coast Electrical Association held at the Biltmore Hotel, Los Angeles, June 8-11, 1926. Seven hundred and fifty members of the association assembled at this meeting carried home to their work an inspiration received at the hands of such leaders of the industry as R. F. Pack, president-elect of the N.E.L.A., W. H. Baurhyte, M. H. Aylesworth, R. H. Ballard, Lester S. Ready, A. Emory Wishon, and W. H. Onken, Jr., all of whom contributed to making this the most successful convention in the history of the organization. The parallel sessions of the association's sections were productive of excellent discussion and reflected a year of important activity in every phase of the industry.

## First General Session—Tuesday

Characterizing the year's work of the association as one of serious activity which has been especially fruitful in results, President Baurhyte in his annual address at the first general session Tuesday morning summed up the accomplishments of the organization during his administration. To those committee workers who have doubted that their executives are cognizant of the value and importance of the work which the committees are doing he gave assurance that the executives fully appreciate the significance of committee activity. To those in the industry who would like a deep draught of optimism he suggested sitting in with the members of the sections and learning at first hand how earnestly and well the key men of the various organizations are devoting themselves to the solution of their problems and the perfection of their industrial practices.



S. WALDO COLEMAN  
President-elect, Pacific Coast Electrical Association

The meeting opened with an address of welcome by George E. Cryer, mayor of Los Angeles, to which R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, San Francisco, responded. President Baurhyte next presented his annual address. He said in commenting upon the improved public relations existing today in the territory:

"A long forward step has been taken by the central stations in the fostering of the friendly relations already existing with the public. Practically all of the electric utilities in the association are now engaged in campaigns of good-will advertising in which the problems and economics of management are explained simply and interestingly. In this there is being developed a literature of the public utility unique in historical interest, economic significance and popular appeal, which can hardly fail to have a deep impress upon the attitude of the people at large toward their central stations."

Commenting upon the progress of the industry during the year he called attention to the importance of domestic refrigeration, pointing out its opportunities to the central station. In his opinion the Red Seal plan promises to be of great benefit to the industry, and he complimented the California Electrical Bureau and the Electragists upon the progress which is being made in this movement. He urged the member companies to pay particular attention to the housewife in any plan for cultivating public good will.

The California Water and Power Act was the subject of the following remarks:

"It is difficult to believe that a measure so destructive of the ideals and principles of free initiative and free enterprise upon which the structure of American institutions and American prosperity and happiness has been reared can meet with the toleration—much less the acceptance—of any considerable proportion of the voters of the enlightened state of California. Yet the issue is so serious and the possible consequences so far-reaching that it would be folly to omit any effort necessary to accomplish, for the third time, its overwhelming defeat."

Samuel H. Taylor, secretary of the association, in his report pointed out that the expanding operations and marked growth of this particular geographic division of the N.E.L.A. will necessitate greater financial assistance from headquarters. He



Delegates and guests at the annual convention of the Pacific Coast Electric Association.

stated that the policy of the national sections to give wider distribution of the work to the divisions and the desire to have greater representation at national section meetings further emphasizes this need. He reported that the association has shown healthy growth during the year and that its membership now numbers in excess of 2,700.

J. F. Pollard, vice-president and general manager of the Coast Valleys Gas & Electric Company, Salinas, Calif., and treasurer of the organization, reported upon the financial status of the association.

#### Reports on N.E.L.A. Convention

"The Atlantic City Convention" was the topic of an outstanding address by R. H. Ballard, vice-president and general manager of the Southern California Edison Company and past president of the N.E.L.A. The electric industry, Mr. Ballard said, has developed to a point where leaders of other industries and of the government itself turn to it for assistance in making America a better place to live. This remarkable growth, most of which has occurred in the past quarter century, is a high tribute to the men of the industry.

The national significance of the Atlantic City convention, he stated, may be understood when one reviews the names of the leaders who participated in the program. Among them was Secretary of the Treasury Mellon, whose subject was "Big Business." Secretary of Labor Davis and William Green, president of the American Federation of Labor, spoke of the changed attitude of labor toward the electrical industry because of the higher standard of living which has been made possible for the laboring man through the increased production which electric power has made possible. Among the other speakers whose remarks Mr. Ballard emphasized were Mrs. John D. Sherman, president of the Federation of Women's Clubs of America, Bruce Barton, noted advertising expert, and B. C. Forbes, editor and financial writer.

The increasing importance of the broadest commercial policy and the beneficial effect of sound merchandising upon public relations were emphasized by practically every speaker of the electrical industry, Mr. Ballard stated. The presentation of the Coffin medal to the Commonwealth Edison Company in recognition of its remarkable commercial growth is indicative of the changing trend of the industry, he pointed out.

#### Officers Elected

The report of the nominating committee was accepted without dissent and a unanimous ballot cast for the following officers for the coming year:

S. Waldo Coleman, president, Coast Counties Gas & Electric Company, president; W. L. Frost, general commercial manager, Southern California Edison Company, first vice-president; P. M. Downing, vice-president in charge of engineering and operation, Pacific Gas and Electric Company, second vice-president; J. F. Pollard, vice-president and general manager, Coast Valleys Gas & Electric Company, treasurer; Samuel H. Taylor, secretary.

Executive committee: W. A. Baurhyte, president, Los Angeles Gas and Electric Corporation; F. E. Boyd, assistant sales manager, General Electric Company, San Francisco; R. A. Sharon, assistant sales manager, Great Western Power Company; A. E. Holloway, commercial superintendent, San Diego Consolidated Gas & Electric Company; F. O. Dolson, vice-president, The Southern Sierras Power Company; A. M. Frost, manager of sales, San Joaquin Light & Power Corporation; D. E. Harris, president, Pacific States Electric Company; G. E. Arbogast, president, Newbery Electric Corporation; C. T. Hutchinson, McGraw-Hill Company of California; C. E. Heise, Westinghouse Electric & Manufacturing Company, San Francisco; R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company; A. B. Day, vice-president and general manager, Los Angeles Gas and Electric Corporation.

#### Second General Session—Wednesday

Instituting an innovation at general sessions of the convention whereby each section of the association is allowed to present a topic of its own choosing as a part of the program, E. F. Perkins, Pacific Gas and Electric Company, San Francisco, delivered a comprehensive paper on "The Value of the Cooking and Heating Load to the Electric Service Company" at the second general session Wednesday morning.

Mr. Perkins' paper will be reprinted in full in an early issue of the Journal of Electricity.

That the ratio between capital investment and gross revenue of the electric utilities is too high and that the intense commercial effort which the central stations must exert to correct this discrepancy will be reflected in better public relations was the message given to the convention by R. F. Pack, president-elect of the N.E.L.A., in the feature address of this session. He pointed out that tangible and intangible competition to the various services which the utilities offer is developing at an alarming rate. He urged that greater sales and merchandising effort be displayed by the central stations.





Convention held at the Biltmore Hotel, Los Angeles, June 7-11, 1926.

### Pack Urges Close Relationship

In discussing the relationship between the geographic divisions of the N.E.L.A. and the parent body he appealed for a closer co-ordination of work between the geographic and national sections. He asked that no effort be wasted on doubtful committee work and suggested that more attention be devoted to informal discussions at geographic conventions and less time to formal programs. He asked that the men appointed to the position of committee chairmen be chosen with extreme care.

In discussing government and municipal ownership he urged that the fight be carried on in the open. The problem of the light and power industry in repulsing the attacks of those who would bring about socialization of that industry, he stated, is the problem of all business and industry, for the program of those who are behind the movement is one of complete socialization of the country.

"In the Name of Advertising" was the subject of an address by Harry S. Carroll, publicity director of the Broadway Department Store, Los Angeles. After discussing various forms of legitimate and illegitimate advertising media, Mr. Carroll described the work of the Better Business Bureau in making advertising ethical. He asked that the electrical industry do its part in stamping out untruth and trickery in advertising.

The work of the lighting committee of the Commercial Section in conducting a series of thirty-five demonstrations before 3,500 members of business organizations in the state was described by Clark Baker, National Lamp Works, Oakland, chairman of the committee. Mr. Baker stated that the demonstrations have resulted in lighting sales and a better feeling of good will on the part of the public. He pointed out, in appealing for a continuation of work of this character, that the homes in this territory are 51 per cent below the minimum standard of one watt per square foot established in the Red Seal specifications.

In commenting upon Mr. Baker's address, President Baurhyte characterized the work of this committee as one of the most important achievements of the year.

### Third General Session—Thursday

Growth of the Electragist movement in the state of California is of vital importance to the entire

electrical industry, according to the facts related in the paper presented jointly by Clyde L. Chamblin, president of the California Electrical Construction Company, and C. T. Hutchinson, vice-president and general manager of the McGraw-Hill Company of California and chairman of the California Electrical Bureau. Many of the great difficulties to be overcome in the effecting of a co-operative organization among the electrical contractors and dealers, who heretofore have been individualists, were outlined and the paper described in detail the methods adopted by the other three branches of the industry to assist in the organization of the fourth.

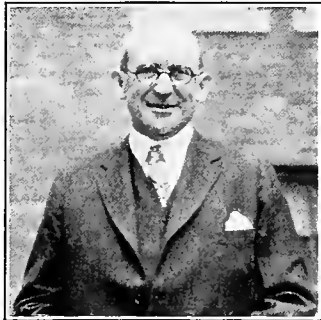
Heretofore such organizations of contractors as did exist were widely separated and concerned solely with their own local problems. Further, such organizations were representative of only a few of the large number of those in that phase of the electrical business. The object of the Electragist movement, according to the above-mentioned paper, is to weld together this vast body of men whose ideas and aims are so fundamentally parallel and whose co-operative effort is so essential to the greater success of the entire electrical industry. Statewide organizations affiliated with the national and the international body are based upon a code of ethics and standards the observance of which will do much to stabilize and build up to a higher quality this important contact between the industry as a whole and the public. The organization is young yet, but results are decidedly promising.

### Dealer Merchandising Discussed

Difficulties encountered in the merchandising of electrical equipment and appliances were the subject treated illuminatingly by O. N. Robertson, chairman of the merchandising section of the California Electragists, Southern Division. Mr. Robertson pointed out that in the past the merchandising end of the contractor-dealer business had been consistently a losing proposition, leaning upon the contracting end for support. The reasons for this condition were many and varied and for the study of these the merchandising section was organized over a year ago. Constructive and co-operative measures that have been developed through the efforts of the section are resulting in a marked improvement in the situation.

For the education and edification of the mer-

chandiser numerous instructional institutes and meetings have been staged under the auspices of the section. Subjects discussed at these meetings have included electric refrigeration, store selling, window displays, ranges and others. Results have been so encouraging that the plan is to be continued and extended in scope. Questions of destructive competition also have come under the



Both reported upon the N.E.L.A.—R. F. Pack, new president of the National Electric Light Association, who expressed that association's aims for next year; and R. H. Ballard, chairman Public Policy Section, P.C.E.A., who gave the high lights of the Atlantic City convention.

activities of the section, which is quite effective in their satisfactory settlement.

The time is approaching, according to Mr. Robertson, when the electrical contractor-dealer, or Electragist, will be able to merchandise properly the multitude of appliances and other miscellaneous electrical equipment. This is a field that has not been satisfactorily covered in the past, causing the power companies in many cases to go into that phase also. Since the dealer makes the initial contact with the power and appliance user through his wiring contracts it is but logical that he should follow the proposition clear through with the merchandising of fixtures, appliances, ranges, heaters and all of the rest.

### New Type Technical Man Coming

Something of an outline of the history of the development of the technical side of the industry and a recital of facts showing the importance of that side in keeping the industry ahead of the demands placed upon it was given by S. J. Lisberger of the Pacific Gas and Electric Company.

Among many other things Mr. Lisberger pointed to the development of a new type of technical man, one who is not purely a scientist and a technician, but is a combination of these and an economist. The new technical man that is growing up within the industry is one who is a technically trained business man capable of giving consideration to a solution that is economically justifiable rather than to that which is only technically perfect. A part of his training is coming from preliminary education, a part from experience and a part from contact with others engaged in the affairs of the industry.

Applications of alternating-current supply and equipment to high-speed elevator installations and the development work incident to the design of this class of machinery were covered by C. A. Sanborn

of Holmes and Sanborn, Los Angeles. Mr. Sanborn outlined the conditions that led to the demand for this equipment and gave a resume of the results obtained from the initial trial installation in Los Angeles in 1921.

Numerous illustrations were presented by Mr. Sanborn to show the arrangement of apparatus. In short it would appear that the a.c. elevator for high-speed passenger service is economical, efficient and otherwise satisfactory and a serious contender for the crown so long worn by the d.c. elevator.

### Public Relations Section General Session— Friday Morning

That the utilities' problems of creating and maintaining public confidence and good will is one of increasing complexity was brought out by speakers at the open meeting of the Public Relations Section Friday morning under the chairmanship of A. B. West, president, The Southern Sierras Power Company. The principal speakers on the program were Lester S. Ready, chief engineer, California Railroad Commission; Miss J. Frances Emans, Southern California Edison Company, and chairman, Women's Committee, and Miss Isabelle Davie, executive secretary, National Women's Committee, New York.

In summing up the public relations situation in the territory of the Pacific Coast Electrical Association A. B. West in the report of his section said:

"The public relations problem of the electrical utilities is the most difficult, complex and perpetual of any faced by the industry. The industrial concern cultivates its public relations in order, primarily, for the purpose of stimulating the sale of its products. We must cultivate ours as the price of continued existence—of the right to do business at all.

"In manufacturing and merchandising, continued existence is based upon fitness for survival developed amid competitive conditions such as obtain throughout the general world of business.

"But the electrical utilities are not weighed in that scale, owing to the fact that they are of necessity monopolies, since under public regulation only as monopolies can they be efficiently and economically operated, and only as monopolies can capital be induced to invest in them restricted to the small return which regulation fixes.

"This fact of monopoly has a two-fold bearing upon our public relations. It forces us continually to combat that latent suspicion of monopoly as associated with exploitation, whose roots lie deep in the history of the struggle of man for equality of opportunity; it also tends, unless untiring



Notables both—M. H. Aylesworth, managing director of the N.E.L.A., who attended the convention, and W. L. Frost, now first vice-president of the P.C.E.A.

vigilance prevents, to affect our own attitude toward our customers and the public generally.

"For between monopoly under public regulation and monopoly under private ownership there exists only the good will of the public as created and deserved, of their own effort, by the utilities themselves. And it is necessary, in order that the measure of good will should be ample, that our relations with the public should be better in every way than the relations between that public and the politically operated utilities. By immemorial custom and habit

of mind people submit to exactions and neglect in the name of government that are not tolerated from unofficial sources.

"It is not alone our customers but the entire public that we must consider, since at times our very existence becomes dependent upon the verdict of a jury comprising the whole electorate.

"Therefore our problem, broadly stated, becomes this: to educate the public as to the facts concerning the industry in all its essential aspects; and to insure that our entire personnel, grounded in these facts, shall embody and express the spirit of service and good will in all their relations and contacts with the public."



Secretary and treasurer, but not identical. Sam Taylor of course will continue to guide the association's business, and James F. Pollard again will supervise its finances as treasurer.

Mr. West then explained the advertising programs which the electrical utilities of the territory are conducting to bring about a better understanding of the mechanics, policies, principles and regulations under which the companies function, and of their competence and good intent.

#### Commission Regulation and Public Relations

Speaking on the subject, "Public Relations Under Public Regulations," Lester S. Ready, chief engineer, California Railroad Commission, appealed for better public relations for the sake of the continuance of sound regulation. He said:

"If you believe in the principles of effective regulation and you desire to see it retained, you can aid greatly by creating better public relations between yourself and your customers. What breaks down confidence in public utilities will have its effect on confidence in regulation. And what breaks down confidence in regulation under the present scheme of things will break down the confidence in utilities. Continuing sound regulation must be based on confidence. Bad public relations between the utility and its consumers creates distrust, makes unpopular the decisions required by the limits of law or for the continuation of service, and results in criticism of regulation and loss of confidence. If you believe in sound public regulation, you will exert every effort to create and maintain the confidence of your customers in you and in regulation itself."

Efforts toward efficiency and economy which have been carried out by the technical and operating men frequently have been nullified by poor public relations, he stated. He complimented the engineers and operating men when he said:

"They have and they are rendering a great service to the utilities and to the public. Their conscientious endeavors in the several companies and in their technical committees, if better known by the public, would instill confidence. No company is acting in good faith with its technical and operating men that does not gain and retain the good will of its customers."

He considered unfortunate the idea of some utility men that nothing could be gained under regulation by greater efficiency and he assured that regulatory bodies seriously are considering the problem of rewards for efficiency. He said:

"It is becoming realized that public regulation cannot assure a continuing return even with efficiency of operation, nor can it grant rewards for special and outstanding efficiency to a company which does not have the confidence of the public it serves. When you believe that you are entitled to reward for efficiency, be certain that the public relations department of your company has been as efficient and effective as you believe your construction and operation

departments have been, and that your company has the good will of the public it serves."

Mr. Ready said farther:

"There has been too great a tendency on the part of many utilities to make an alibi of the Railroad Commission. Too often, when it is not desired to do certain things, the consumer is advised, 'The commission will not let us.' The Railroad Commission will take the responsibility for its acts of regulation; be sure you take the responsibility for your acts of management. 'Passing the buck' to the commission may ease the way temporarily, but it detracts from the ultimate lasting public confidence necessary to public utility."

#### Women's Work in Public Relations

The work of the women in the industry was described by three speakers at this meeting in that portion of the program arranged by Miss J. Frances Emans, chairman of the Women's Committee of the Pacific Coast Electrical Association. In introducing the subject Miss Emans declared that public relations is a problem involving both men and women. Since fifty per cent of a utility's consumers are women, she stated that the women workers in the various companies should be equipped to tell the utility story to them.

Miss Isabelle Davie outlined the plans of the National Women's Committee and described the efforts which are being made to co-operate with these committees in the various geographic sections of the N.E.L.A. She appealed for the organization of a Women's Committee in every utility in the country and told what has been done in some of the companies where these committees already are functioning. She declared that the function of interpreting the uses of electricity to the feminine public of a utility is one for the women of the utilities themselves to perform.

Mrs. W. L. Dinely, wife of one of the Southern California Edison Company's employees at Santa Ana, described the work which had been done in that city in organizing the women related to the utilities only by marriage. Through the efforts of a certain group of wives of employees a club has been organized and is playing an important part in the social life of the women of that community.

#### New Section Chairman Announced

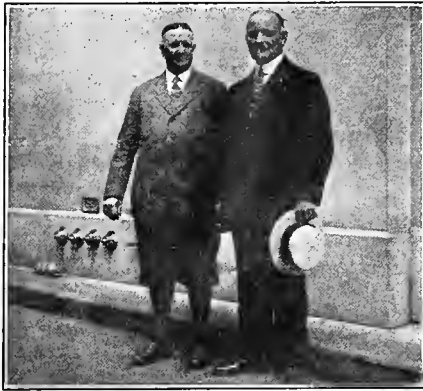
In a short business meeting held following the close of the Public Relations Section meeting reports were heard from the committee on the President's address and the committee on resolutions. Mr. Baurhyte, reporting for President-elect S. Waldo Coleman, announced the various section and committee chairmen for the coming association year. These chairmen follow:

Public policy committee—R. H. Ballard, vice-president and general manager, Southern California Edison Company; Public Relations Section—A. B. West, president, The Southern Sierras Power Company; Technical Section—J. G. Rollow, chief electrical engineer, Los Angeles Gas and Electric Corporation; Commercial Section—H. K. Griffin, commercial

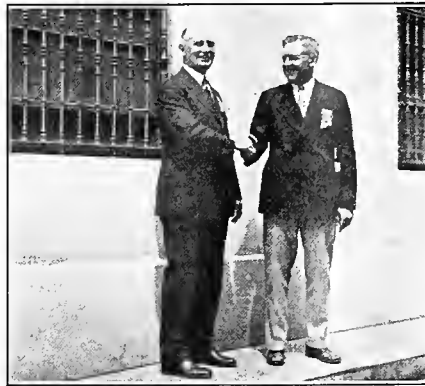


Responsible for the convention's success in large part were R. A. Hopkins, who arranged the convention program, and Dan L. Scott, in charge of convention publicity.

agent, Western States Gas & Electric Company; Accounting Section—H. W. Johnson, Coast Counties Gas & Electric Company; Advertising-Publicity Section—R. E. Smith, advertising manager, Southern California Edison Company; Purchasing and Stores Section—C. D. Weiss, San Diego Consolidated Gas & Electric Company; Transportation Section—S. B. Shaw, Pacific Gas and Electric Company; Insurance Committee—Herbert Dewes, The Southern Sierras Power Company.



C. E. Heise, ready for golf, lingers to congratulate Paul M. Downing upon his election to second vice-presidency of the association.



S. Waldo Coleman, new president of the association, receives congratulations also, from R. E. Northmore, general convention chairman—and vice versa.



A. B. West, chairman Public Relations Section; F. A. Leach, past president of the association, and Percy Booth, in charge of ladies' entertainment.

### Public Policy Section General Session— Friday Afternoon

Emphasis was placed on the part electricity plays in the industrial, social and economic life of America at a general meeting attended by five hundred convention delegates and visitors under the auspices of the public policy committee and presided over by R. H. Ballard. In introducing the theme of the meeting, "Interconnection in Business," Mr. Ballard pointed out that the electrical industry is the basic thread of the life of this country. Without electricity, he declared, business would become stagnant and the American people would return to conditions of a quarter of a century ago.

"The Interdependence of Industry" was the title of the opening paper by W. H. Onken, Jr., editor of *Electrical World*. Mr. Onken stated that this country needs men with a healthy attitude toward our form of government and toward its democratic institutions. The American public, he pointed out, is intertwined so closely in its daily life and so interdependent in its interests that even the slightest dislocation of its social and industrial order may work havoc. Regarding the electrical industry he said:

"Our very success carries with it an element of danger. While we have succeeded through enterprise and engineering skill in rendering a very cheap and universal service and have through sales of securities to customers and employees decentralized the industry, aspiring politicians, who know little of the business and care less, seek to socialize it. But, my friends, the door of individual opportunity which assures to every man the full control of a just product of his own labors, is the only way of building a civilization that will last and will progress. Socialization chokes individual opportunity. The panaceas which socialists sometimes offer, wild, visionary and unworkable as they are, are absolutely at variance with the sentiments, with the tenets and spirit of American institutions.

#### Taxation Education Needed

He pointed out the necessity for the education of the public on the question of taxation when he said:

"It is remarkable how our citizens condone undemocratic and un-American movements and how readily they vote appropriations of millions of dollars for socialistic experiments with the mistaken notion that someone else, not themselves will have to pay. These persons are in need of elementary lessons in taxation.

"Swollen taxes inevitably express themselves in swollen prices. A city or a state cannot go on spending huge sums in socialistic ventures without raising the cost of living to all citizens. The latter may imagine that they do not have to pay because no tax collector comes to them direct. But they are subject nevertheless to a heavy and inescapable taxation in the form of higher rents, a greater outlay for food and raiment, and the other necessities of life. Every time a voter favors a large public expenditure for a service which a municipality is not properly qualified to render, he is really voting to boost his own living costs."

He cited numerous specific instances by which he showed in concrete terms that electrical energy was essential in the operation of the chemical, textile, and iron and steel industries, and so, indirectly, in the daily lives of the American people and the cost of living. In concluding he emphasized the interrelation of all industries and said: "Gentlemen, I

plead with you for faith in your fellow men, in your industry, in your country and its possibilities. Recognize that no man, no industry, no section is sufficient unto itself, but that we are all interdependent and only as we work together in harmony will success crown our efforts."

#### Declares Taxation Demagogue Weapon

No less an expert than Dr. Milbank Johnson of the Pacific Mutual Life Insurance Company and president of the California Taxpayers Association, addressed the meeting on the subject of "Taxation." Dr. Johnson declared that taxation is the principal weapon of the demagogue and that it is often wielded to the extent of preventing the economic development of the nation's natural resources. From the standpoint of the cost of government as reflected in the issuance of tax-exempt securities and in the reduction of taxes paid by private business, he stated that no government, city, county or state should compete with private business in the supply of a service which can be provided as cheaply and more efficiently by private business. He pointed out that many corporations pay more to the government in the form of taxes than they pay in dividends to their security holders. He appealed for the organization of all taxpayers under the banner of economy in taxation, declaring that taxation is not a problem of any individual or industry but that all eventually must pay the bill.

Dramatically tracing the development and progress of the electrical industry under the genius and guidance of individual initiative, A. Emory Wishon, vice-president and general manager of the San Joaquin Light & Power Corporation, Fresno, Calif., declared that as a result of this remarkable progress nowhere on earth is there a more stable government, a more happy and prosperous people, and nowhere is there a greater consumption of electricity per capita or a lower cost for the service rendered than in America. He said:

"We like to measure our industry's service in man-power rather than in horsepower. Electric motors are performing as much work as can be done by one hundred seventy million able-bodied men. Our population is one hundred sixteen million with forty-five million in gainful occupations, or almost four electrical able-bodied slaves for every man earning a living. That explains why we as a nation are prosperous, why our goods can be carried into the seven seas of competition, why American living standards are high.

#### Electricity Is Modern Slave

"If we add those electrical slaves which turn night into day, our total electrical slave labor amounts to three hundred million.

"The Chinese coolie draws a princely salary in comparison. The slave who receives no wage at all costs many times as much. The wage scale of the electrical slave is \$5 per year per able-bodied man. These slaves are real workers in the electrical utility business. As has been said, they do not watch the clock; there is not a lazy man among them; no task is too great and none too mean; no work too good and any good enough. They are jacks of all trades and experts in each; they never sleep, never rest, never play. They are never sick, never tired, never incapacitated for duty. They have neither alibis nor excuses; they know not the meaning of disloyalty. They work for the rich and poor alike; the quality of their work is the same



to all. They are the servants of the servants as well as of the master. They stand ready and are anxious to take on new and additional tasks every day. Their very purpose in life is to speed up business, to advance the standards of living, to serve humanity!

"Three hundred million electric slaves performing innumerable tasks without hesitation, yet not a single brain in the anatomy of their combined numbers—but for every task performed, their every movement must be anticipated, planned and directed.

"Ceaselessly they perform those tasks, directed by the vision of our pioneers and the genius of our inventors, supplied with working tools by our manufacturers and distributed to their work and put into motion by engineers and men of our electric utilities."

In bringing to a close this important session R. H. Ballard said that no one could leave the meeting without the impression that in California a big job is being done adequately by private utilities, publicly owned, and operating under sound regulation.

### THE ELECTRIC CLUB LUNCHEON

Tuesday noon The Electric Club of Los Angeles acted as host at a luncheon marked by brief and timely addresses interspersed with attractive entertainment. Both the electrical and the moving picture industries were represented by speakers—the former by M. H. Aylesworth, managing director of the National Electric Light Association, and S. E. Gates, General Electric Company, and president of the club, and the latter by John Stuart Blackton, the oldest active producer in the motion-picture industry, and Monte Blue, who acted as entertainment chairman.

Mr. Aylesworth told of the great efforts that are being made by the privately owned electric power and light industry to bring to every industrial plant, commercial establishment and home the advantages of electricity. He stated that no task was too great for the executives and the thousands of individual owners of these central-station companies and that they stand ready to undertake any developments that seem necessary for the good of the communities they serve.

Mr. Blackton focused the attention of the 700 men and women at the luncheon upon the important part that light plays in the making of motion pictures, going back thirty years to the days of the "Black Maria" that was dependent upon the sun for illumination. He stated that the electrical industry had kept pace with the motion-picture industry but that there were still illuminating problems that should be given attention.

### ANNUAL BANQUET

A fitting climax to a successful convention was the annual banquet engineered by R. E. Smith of the Southern California Edison Company and which took place Friday evening, June 11, in the ballroom of the Biltmore Hotel. Numerous entertainment features were presented during the course of the evening and each seemed to please the entire assemblage.

The feature and only speaker of the evening was Charles F. Stern, president of the Pacific Southwest Trust & Savings Bank of Los Angeles.

Setting his attention upon 1940, the speaker startled his hearers with his strings of figures and his recitations of facts to prove his statements to be entirely within the bounds of normal expectancy. A population of some eleven and a half million is expected by that time. This influx is to bring about a tremendous increase in the development of irrigated lands and is destined to assist in continuing the decrease of dry farming in all of its branches. It will require more water by 55 per cent than that which is in sight now and more power by 35 per cent. Fifteen billion dollars per annum for new capital between the four major fields; agricultural, power, industrial and commercial is expected to be the demand. Foreign competition in all markets must be dealt with.

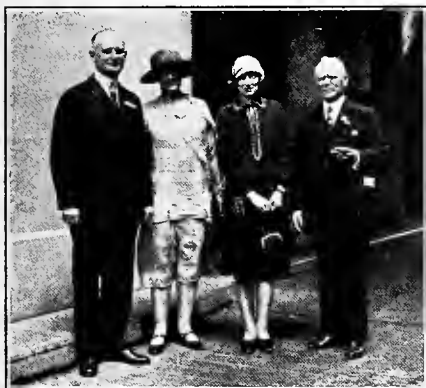
A new kind of co-operative effort and a new kind of teamwork are the chief requisites to be met by the individual and the community if the problems of the next fifteen years are to be met advantageously. Mr. Stern especially decried the short-sighted efforts of some who are proposing a division of the state of California and who seem always to be willing to divide constructive efforts but never willing nor able to consolidate them for the greatest common good.

Discussing the Colorado development from a non-partisan stand Mr. Stern outlined the tremendous loss to the states affected through the non-development of that mighty river. Capable of bringing to life over a million and a half acres of arid but fertile land, in addition to supplying some of the power that will be so sorely needed within the next fifteen years, the Colorado can continue to be nothing but a total loss if not developed and developed properly and adequately and with the idea of the greatest good for the entire territory affected.

In closing, the speaker outlined the trend of civilization from the shores of the Mediterranean to the shores of the Atlantic, and now seemingly destined for a final stand upon the shores of the Pacific. He urged the common development of resources, the mutual consideration of common problems and a full inter-community effort for common good.

### President Baurhyte Presents Badges

In commemoration of the close of the tenth year of activities for the Pacific Coast Electrical Association, President Baurhyte presented the association tokens to each of the nine presidents preceding him at the helm of association affairs. These men included R. H. Ballard of the Southern California Edison Company; H. F. Jackson of the Sierra and San Francisco Power Company; Samuel Kahn, formerly of the Western States Gas and Electric Company and now executive vice-president of the Market Street Railways in San Francisco; E. A. Wishon of the San Joaquin Light & Power Corporation; L. H. Newberg of the Pacific Gas and Electric Company; A. B. West, of the Southern Sierras Power Company; J. B. Black of the Great Western Power Company; L. M. Klauber of the San Diego Consolidated Gas & Electric Company; and F. A. Leach of the Pacific Gas and Electric Company.



Women's place in the industry being recognized by S. Waldo Coleman, new president, in the first picture to the left, as he and William Baurhyte, retiring president, take their places beside the Misses J. Frances Emans, Pacific Coast chairman, and Isabelle Davie, national chairman, of Women's Committees. In the center picture H. K. Griffin announces that he would like to enter a contest for the best-looking delegation, supported as he is by Mrs. Griffin (left) and Mrs. Mary Stanland. Some of the winners of customer-service essays attending the convention, in the picture on the right. Front row, left to right—Mrs. P. S. Miner, Mrs. Bertha A. Briggs, Mrs. Grace Groscup, Misses May Harris and Viola Palmer and Mrs. Amy L. Bidwell. Back row—Harold C. Craig, John A. Binard, C. J. Ellis, L. M. Mossman, L. S. Heseman, D. P. Merrill and H. V. Patton.

Upon completion of the presentation of these awards Mr. Baurhyte introduced S. W. Coleman, president-elect of the association, and presented him with the badge of office. Mr. Coleman in turn presented Mr. Baurhyte the token of the association in memory of his year of service in its behalf. The meeting then adjourned for the final dance program.

## TECHNICAL SECTION

Exceptionally well organized were the sessions of the Technical Section. Two afternoons were allotted to the section for the summarization of the entire year's work of its nine committees. Each session presented a full program from 2 until 5:30 p.m., and more than 250 delegates and visitors were in constant attendance.

The program was arranged so that each committee chairman had an average of some fifty minutes for the presentation of his annual report and for the presentation of other matters pertaining to the work of his committee. Seven of the committees presented speakers upon subjects relevant to the work of their particular committees. These speakers were drawn from various branches of the industry, each authority in his field bringing to the meeting interesting and useful information.

In outlining the work of the committees the chairmen briefly reviewed the papers and reports published in the convention issue of the Journal of Electricity and in preceding issues as serial reports. In the following reference will be made only to those subjects which are not treated in material already published in the May 15 issue of the Journal or in previous serial reports.

R. R. Cowles, Pacific Gas and Electric Company, chairman of the Technical Section, in his report stressed the great value to the association collectively and to the members individually of the contact with the national technical committees. This co-operative effort with the national body has gone forward especially during the past year under the constant pressure of Mr. Cowles and others who realize the value of such work. The section's so-called vice-chairmanship plan has had its first year of service and bids fair to be eminently successful in preserving continuity of thought and effort on the part of each of the committees and in preparing the chairman for his duties through his year of service as vice-chairman.

Accident-prevention work has made great strides under the guidance of J. M. Buswell of the San Joaquin Light & Power Corporation, chairman of that committee for the past two years. Constant education and continual effort are the prices of an accident-free organization Mr. Buswell pointed out. He also gave statistics proving conclusively that better financial and economic conditions result for worker and employer alike when accidents are eliminated as they may be.

### Insull Medal Presented

Four Insull medals have been presented during the past two years for the saving of human life by application of the Schaefer prone-pressure method of resuscitation. These have gone to Mr. Gaetner of the Southern California Edison Company, Santa Paula, Calif.; Howard Dynan of the California Oregon Power Company, Medford, Ore.; J. G. Rhoday of the Southern California Edison Company, Fullerton, Calif., and C. A. Laverty of the Midland Counties Public Service Corporation, Atascadero, Calif. The last three of these have been presented during the past fiscal year. Mr. Laverty received his award at the convention Technical Section session in Los Angeles, June 9, 1926. Another application, requesting a medal for T. E. Knackenstadt of the California Oregon Power Company, has been passed on to the national committee and the award undoubtedly will be made in the near future. Mr. Insull's standing offer of this medal for successful resuscitations has done much to stimulate an interest in this vital first-aid feature.

E. G. McCann, manager of personnel, Pacific Gas and Electric Company, San Francisco, spoke in behalf of accident-prevention work. He stressed the vital importance of such measures, pointing out that industry has been speeded up and that the old-time individual scheme has given way to the group scheme. This has resulted in a reduction of the sense of individual responsibility and a consequent increase in accidents, with a definite necessity for greater precautions than were required under the old scheme.

The economic value of accident prevention only recently has been recognized and appreciated by the representative industries, according to Mr. McCann. Reductions of lost time and organization disruption have shown up so favorably on the balance sheets that at last accident-prevention

work is regarded as an investment rather than as an item of expense.

### Greater Responsibility on Construction Jobs

The shifting nature of construction laboring forces makes accident-prevention education and effort on construction jobs a far greater responsibility than on other types of more permanent jobs, according to D. H. Redinger, Big Creek resident engineer for the Southern California Edison Company. Mr. Redinger prepared a paper for the session that was presented by Mr. Blight, assistant manager of construction for that company, due to Mr. Redinger's inability to attend.

Care in the selection of foremen and the placing of direct responsibility upon them, together with the accident prevention committees, placards and educational effort as carried out on the Big Creek project under Mr. Redinger's direction, have borne sufficient fruit to give conclusive weight to his statements. A full-time safety engineer has the immediate responsibility for the detail of the work at Big Creek.

### Apparatus Committee Accomplishments

According to the report of J. C. Gaylord of the Southern California Edison Company, chairman of the electrical apparatus committee, some of the major accomplishments of that committee for the past year are as follows:

1. Exchange of ideas, operating practices and design data regarding substations.
2. A good start in the collection of comparable data regarding the actual operation of circuit breakers under service conditions. Through this study it is hoped that a more intelligent application of oil circuit breakers will be possible in the near future.
3. Progress in the investigation of methods and practices of grounding electrical apparatus. This study is planned to result in grounding practices that will facilitate satisfactory relay operation and improve relations with communication companies regarding possible interference between power and communication circuits. This work is under the supervision of the apparatus committee but is being carried on by a joint subcommittee of that committee, the safety rules and the overhead systems committee.
4. Report of unique application of relays.
5. Joint work with the overhead systems committee in behalf of a standardization of transformer ratios. Similar work has been under way in the national apparatus committee and will be continued by both committees.
6. Study of supervisory control applications just started.
7. Mutual benefit through co-operation and contact with the national committee.

### New Vacuum-Type Breaker Possibilities Startling

Presaging the possibility of radical changes in theory and design of circuit breakers, R. W. Sorensen, professor of electrical engineering, California Institute of Technology, Pasadena, rather startled the Technical Section. Professor Sorensen exhibited a small, glass, vacuum-type circuit breaker, of such dimensions that it could be slipped into a coat pocket, and stated that in the laboratory the breaker many times had interrupted successfully currents as high as 300 amp. at 15 kv. without pitting of contacts or signs of stress.

Stating that this type of circuit breaker is but in the incipient stage of its development, Professor Sorensen presented data showing that many advantages would accrue from the application of a vacuum breaker provided it can be developed satisfactorily. Nothing definite can be said at the present time.

Practically all of the work done by the hydraulic power committee during the past year has been done for the national committee, according to Walter Dreyer, Pacific Gas and Electric Company, chairman of that committee. Some extremely valuable results have been obtained through the committee's investigations. This was outlined in the May 15 issue of the Journal of Electricity and will be published in full by the N.E.L.A.

### Experimental Arch Dam Described

The experimental arch dam under construction by the Southern California Edison Company for Engineering Foundation was the subject of an interesting illustrated lecture by H. W. Dennis, construction engineer for the Edison company. Mr. Dennis, stated that never had there been a failure of an arch dam and that this fact led to

the belief that exhaustive tests and measurements of the actual stresses in such a structure would bring forth information permitting greater construction economies with no reduction in safety. To this end the test dam has been constructed and will be tested to destruction. The Bureau of Standards is represented by W. A. Slater who is in charge of the securing of test data, thus assuring the greatest possible accuracy and authenticity of results.

The dam is 60 ft. high,  $7\frac{1}{2}$  ft. thick at the base, 2 ft. thick at the 30-ft. level, 2 ft. thick at the 60-ft. level, built on a constant radius, has a crest length of 140 ft. and will store a maximum of 5 acre-ft. of water. The crest will be raised to a height of 100 ft. if the structure survives the repeated tests to be run. Additional funds to the amount of \$26,000 are necessary before the experiment can be carried further. Present work was completed June 4.

H. N. Kalb, San Joaquin Light & Power Corporation, chairman of the inductive co-ordination committee, was unable to attend, but his report was presented by E. J. Crawford of that company. Problems incident to radio interference, power-company communication lines, and the application of supervisory control over telephone lines are under study by the committee.

#### Radio Man Points its Importance to Industry

Radio has added a million dollars gross revenue per annum to the systems of California power companies, according to A. H. Halloran, president, Pacific Radio Trades Association, who spoke under the auspices of the above committee. This additional revenue makes it well worth while for the power companies to continue and to extend their efforts in behalf of the reduction of radio interference. Mr. Halloran stated that while less than 10 per cent of radio troubles could be attached in any way to power lines or equipment still it is necessary for the power companies to co-operate fully in campaigns of education and to make conspicuous efforts in behalf of the radio public. The public relations angle of the radio situation is of vital importance, according to the speaker.

Mr. Halloran suggested co-operative interference committees in every community to include power-company men, radio fans and men of business and social prominence in the community. These committees should foster public education through the press, through radio talks by competent individuals and by other means. Also they should function to assist in the reduction of all radio disturbances to the best mutual advantage, impressing upon the user of a set that the first responsibility is his to determine that none of the appliances on his premises are the sources of his troubles.

#### Meter Courses Held Successful

Meters and metering equipment hold the purse-strings of the power company as pointed out by R. G. Jones, The Southern Sierras Power Company, chairman of the meter committee. Mr. Jones emphasized the importance of proper meter maintenance and of the necessity for properly trained men for this type of work.

Three metermen's instruction courses were held this past year under the jurisdiction of the committee, and the results were entirely satisfactory. These courses were held at the University of Arizona, Tucson; California Institute of Technology, Pasadena; and the University of California, Berkeley.

Terming the electric meter the power company's cash register, F. A. Redding of the Southern California Edison Company urged the idea of "eternal vigilance as the price of meter accuracy."

#### Pole Treatment Will Get Further Study

The study of the life of treated and untreated poles undoubtedly was the most valuable of the several contributions of the overhead systems committee during the past year under the chairmanship of G. A. Riley of the Los Angeles Gas and Electric Corporation. The reports as presented in the May 15 issue of the Journal of Electricity are recommended to those interested in overhead subjects.

For next year the committee expects to study details of overhead construction, new 220-kv. construction, maintenance of steel poles and towers, grounding of primary and secondary lines, and to continue the study of pole life.

#### Discuss 220-kv. Line Operation

Interesting features of the new 220-kv. Big Creek line of the Southern California Edison Company were given by H. H. Michener of that company. This line now is partially completed and when completed will provide a third tie between the Big Creek string of hydro plants and the com-

pany's southern load center. The line will be  $223\frac{1}{2}$  miles long, will tie in to the existing system near Eagle Rock substation and at Magunden switching station near Bakersfield. Present construction is for a single-circuit line, but right-of-way has been obtained that will permit the ultimate construction of four lines on 80-ft. centers. The line follows an entirely different route from that of the original Big Creek lines.

In discussing 220-kv. construction F. R. George, Pacific Gas and Electric Company, gave some facts regarding the extension of the Pit lines south over the San Joaquin and Sacramento Rivers on towers ranging from 260 to 459 ft. in height. H. A. Barre of the Southern California Edison Company stressed the fact that ownership of rights-of-way is practically necessary in the present day and that this is the most expensive item of line construction. Mr. Barre also reminded his listeners that the mechanical problems incident to transmission construction are more serious than the electrical problems.

#### Steam Plant Efficiencies Increased

Progress in modern steam-plant design as followed by the prime movers committee was reviewed by J. W. Andree of the Southern California Edison Company, chairman of that committee. Numerous valuable papers prepared by that committee appeared in the May 15 issue of the Journal of Electricity.

F. G. Philo of the Southern California Edison Company gave a most instructive illustrated lecture on the details of design of the modern steam plant that have made possible the great increases in plant efficiencies. Mr. Philo's paper was replete with data, and it is scheduled for publication in the Journal in the near future.

Co-ordinated effort in the application of standard safety regulations and ordinances was the theme of W. R. Frampton of the Southern California Edison Company, chairman of the safety rules committee, in his report. E. J. Crawford of Fresno, W. H. Talbott of San Diego, and Rollin Smith of Los Angeles also spoke in support of uniform electrical safety ordinances and a more close co-operation of all parties concerned in support of the safety code.

#### Underground Committee Studies Twelve Subjects

Twelve subjects have been under study by the underground systems committee, according to P. E. Chapman of the Pacific Gas and Electric Company, chairman of that committee. These were as follows:

Improvement of design of cable terminals, study of Kenotron testing set, treatment of metal underground conduits, high-voltage underground cables, cement duct, junction boxes, submarine cables, developments in motor-driven pumps, methods of keeping underground records, apparatus used in the determination of underground cable temperatures, location and design of transformer vaults for heavy loads, and prevention of cable electrolysis.

Schools of instruction for cable splicers were outlined by P. M. Downing, Pacific Gas and Electric Company, who gave experiences of his company in the conduct of these schools. He states that the results were a higher grade of workmen and a better grade of work done. The history of cable design and some of the many problems of that industry were presented by R. C. Harris of the Standard Underground Cable Company.

### COMMERCIAL SECTION

Preparation of three manuals designed to aid utilities in the sale of their product and the holding of an essay contest on the subject of customer relations were among the outstanding accomplishments of the Commercial Section of the Pacific Coast Electrical Association reported at the annual convention of the organization. The sales manuals covered the subjects of the sale and installation of domestic water heaters, the sale of industrial heating and the sale of electric ranges. The essay contest gave three thousand public-utility employees a better understanding of the proper and courteous treatment of customers and brought twenty-five employees ranging from linemen and clerks to meter readers and stenographers to the convention as guests of their various companies. The third important achievement of the year was the holding of a series of demonstrations on proper lighting before a series of thirty-five meetings of business men's clubs throughout the state.

In reviewing the work of the year at the first Commercial Section meeting, H. M. Crawford, sales manager, Pacific Gas and Electric Company, chairman of the section, stated that the companies of the Pacific Coast are alive to the value of aggressive energy-selling and are making a

determined effort to show the same leadership in this field that they have shown in the fields of engineering and operation. He said in part:

#### Cites Need for Load Increases

"Engineering has brought the solution of the major production and distribution problems to a high state of perfection, and improvement in earnings will only come from the reduction in operating costs or the development of an increased diversified load through intelligent sales effort. Such effort means the filling up of load curve valleys by adding to our lines business which will come on at the proper time of day, month or year and having an attractive revenue value.

"Such work is now being accomplished by Pacific Coast companies by employing the highest class of engineering talent in their sales departments, and directing greatly augmented sales campaigns on the basis of proper research and study as to the definite results desired to be obtained. Such sales effort will not only increase energy consumption, but will reduce investments per kilowatt of demand and improve the relations with our customers, the public."

#### Essay Contest Winners Attend Convention

Lloyd Henley, San Joaquin Light & Power Corporation, chairman of the customer relations committee, described the essay contest conducted with the booklet "The Proper Treatment of Our Customers" as the basis. Five hundred essays were received and it is estimated that 2,500 other employees were interested sufficiently to study the contents of the booklet. The following were among the prize winners from the various companies:

Coast Counties Gas & Electric Company: Mrs. Bertha A. Briggs, cashier and counter clerk; Miss Viola Palmer, payroll and stock clerk; Miss May E. Harris, assistant cashier and counter clerk.

Coast Valleys Gas & Electric Company: C. J. Ellis, clerk, customer billing department.

Ontario Power Company: Mrs. Amy L. Bidwell, chief clerk; Walter Hastings, charge of meter testing department; Harry Allen, charge of range and meter installations.

Pacific Gas and Electric Company: Mrs. Grace Groscup, stenographer; A. R. Gledhill, collector; H. B. Patton, chief sales clerk.

San Joaquin Light & Power Corporation: DeWitt Scott, district power salesman; L. M. Mossman, line crew foreman.

Southern California Edison Company: Henry Nelson, chief clerk; Dwight K. Merrill, lineman; Miss Pansy F. Miner, information clerk; Miss Fanny Bledsoe, clerk.

Southern Sierras Power Company: L. S. Heseman, salesman; John Binard, groundman; Alice Scott.

San Diego Consolidated Gas & Electric Company: A. C. Nadon, work order department; W. E. Richmond, employment agent; P. H. Adams, investigation department.

Truckee River Power Company: James Rice, gas fitter.

Western States Gas & Electric Company: Harold C. Craig, assistant superintendent, electric distribution department.

In the discussion which followed, the suggestion was made that this work be carried on during the coming year.

#### Need Trained Industrial Heating Salesmen

Reporting for the power committee, F. E. Boyd, General Electric Company, San Francisco, chairman, described the industrial heating sales manual which has been prepared by his committee. He urged central stations in this section to employ trained industrial heating sales engineers, predicting that within the next ten years the industrial heating load will exceed the present motor load on the lines of the power companies. He described the lectures which were conducted by his committee during the year in the principal sections where there is a field for this load.

Discussing this report, Max Lee, Westinghouse Electric & Manufacturing Company, Los Angeles, stated that there exists in California a large volume of small industrial heating load which will carry a rate averaging between one and two cents per kw-hr. The problem involved, he stated, is one of selling the economic use of electricity for this work in competition with other fuels.

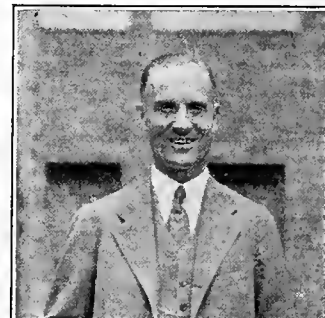
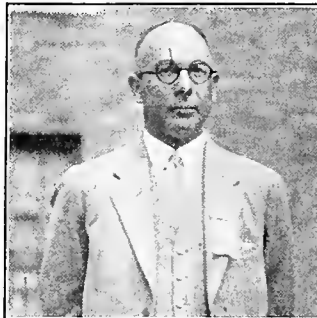
#### Water Heater Survey Started

Among the features reported upon by the electric cooking and water heating committee under the chairmanship of P. P. Pine, San Diego Consolidated Gas & Electric Company, was the proposed electric water-heater test to be conducted during the coming year. The instruments used for the electric range survey in the Pacific Northwest have been sent to California, and surveys are under way at the present time to discover blocks of electric water heaters so located as to be readily available for testing. This work will be under the direction of H. K. Griffin, chairman of the section for the coming year.

The air-heating subcommittee reported that there has been considerable increase in the sale of electric air heaters during the year and pointed out a number of large apartment houses, lodges, churches, schools and office buildings which had been so equipped. The question of insulation of buildings to be heated by electricity was suggested for next year's committee to study.

H. H. Douglas, Everhot Manufacturing Company, Los Angeles, described the water heating manual which had been prepared by a subcommittee under his direction.

The feature of the domestic cooking subcommittee's report was the graphic lecture presented by E. F. Perkins at one of the general sessions and described elsewhere in this issue. However, a symposium was held on electric range



Accomplished a good work during the year, did Roy R. Cowles, chairman of the Technical Section, and Lloyd Henley, chairman of the customer relations committee of the Commercial Section, bringing to the convention many winners of the prize essay contest conducted under his direction.

merchandising in which opinions were expressed on such subjects as who should sell electric ranges, the relationship between salesmen and sales, and compensation of salesmen. The opinion was expressed that central stations should sell at full list price so that all other outlets for electrical merchandise could participate in the sale of ranges. It was pointed out that the average quota for a salesman was ten ranges and five water heaters per month. A plan of following up a sale in two weeks by a salesman for the purpose of securing prospects was described.

The report of the electric truck committee presented by H. H. Singletary, Pacific Gas and Electric Company, brought forth the fact that the enthusiasm displayed by central stations on the subject of electric trucks has waned and that steps must be taken to secure central-station co-operation if these vehicles are to be sold.

#### Lauds Work of Lighting Committee

Various comments were made upon the report of the lighting committee presented by Clark Baker, chairman, at one of the general sessions. Dr. A. E. Hoare, Los Angeles optometrist, declared that the work of the committee was a contribution to optical hygiene and had served to bring the doctors and the industry closer together.

#### Refrigeration Merchandising Discussed

Reports of the merchandising committee, headed by J. W. Wrenn, Great Western Power Company, dealt with the sales of washing machines and ironing machines by central stations, with unified merchandising programs covering all branches of the industry, and with the subject of time payments. Refrigeration was also the subject of one report and considerable discussion. On this latter subject E. A. Norton, manager of the electrical department, Barker Bros., Los Angeles, reported that his establishment was making exceedingly fine progress in the sale of refrigeration units. He declared that advertising by the manufacturers has brought about public acceptance of this device. He has had the greatest success with salesmen on a straight commission basis and 90 per cent of the machines sold have been for cash. His salesmen earn between \$300 and \$500 per month. So far his firm has found that refrigerators require less servicing than washing machines.

H. C. Rice, Southern California Edison Company, reported that his company had sold 450 machines since the first of the year. He pointed out that shipment from the factory requires careful servicing upon arrival and before installation. It is his company's policy to send the machines to the consumer's house cold and ready to operate. Service men make calls once a week for the first month and thereafter only upon call from the consumer.



## ADVERTISING-PUBLICITY SECTION

Reports of the standing committees of the section and two papers occupied the first meeting of the Advertising-Publicity Section, Tuesday afternoon, with D. L. Scott, Los Angeles Gas and Electric Corporation, chairman, presiding. The information committee report was read by Frederick S. Myrtle, Pacific Gas and Electric Company, chairman, and outlined the plan of the committee to establish information representatives of the committee with each company to whom inquiries for information relative to the industry may be addressed.

In the standards committee report, read by J. Charles Jordan, Pacific Gas and Electric Company, the work of that body in the reorganization of the section was outlined. The section organization, it was stated, had been perfected, as expressed in the "Book of Standards" of the section setting forth the scope, purposes, procedure, and



"Shorty" Sherman presents the longest view of convention golf at the San Gabriel Country Club.

standards of practice in the conduct of advertising and publicity activity of member companies. In the code of standards the section has gone on record against the patronage of special editions or advertising pages as wasteful of advertising appropriations.

### Art Work and Layouts Described

"Art Work and Photography in Advertising," was discussed by Sydney W. Green, San Joaquin Light & Power Corporation. This paper detailed the psychological value of illustration in advertising copy.

In the talk of Henry G. Little, account executive, Lord & Thomas, Los Angeles, "Typography and Layout in Advertising," stress was laid upon the importance of intelligent application of type and space in the preparation of attractive advertisements. Both talks were followed by lively discussion.

### Special Editions Scored

The second meeting of the Advertising-Publicity Section, Wednesday afternoon, was even more enthusiastic than the first, and the attendance reached 50. The first speaker, Walter P. Burn, San Francisco district manager, American Newspapermen's Association, presented the newspaper as the most effective medium for advertising in his talk, "Media and the Use of Newspaper Space for Advertising."

He gave figures to show the preference of utilities for newspapers as media for advertising over any other media and pointed to the reasons for newspaper effectiveness in reader interest, circulation and the fact that newspapers are read for advertising news. When Mr. Burn had finished a spirited discussion took place in which special advertising pages and editions fostered by newspapers to commemorate special occasions were taken to task. It was felt that this frank expression of the attitude of utility advertising men upon the subject might help to clear up any misunderstanding in the future regarding the subject of special advertising.

"Newspaper Publicity, What and Why and How," was the subject of an interesting paper given by Al. C. Joy, San Joaquin Light & Power Corporation. Mr. Joy demonstrated that newspapers are anxious to get the real news of the industry and often rely upon the central stations to furnish them with copy of this sort. He warned against misuse of the practice and showed that newspapers resent efforts to place advertising in news stories. General discussion followed the paper, bringing out experiences of other companies in this respect.

### Tells "Busy Buttons" Life History

"The Life History of Busy Buttons," as related by the creator of the trade character, R. E. Smith, Southern California Edison Company, proved an interesting account. Mr. Smith gave the reasons for the creation of the character, outlined his introduction to the world by means of the pamphlet, "The Story of Busy Buttons," and subsequent activities engaged in by "Busy Buttons." He told of the favorable reception of the idea and the popularizing effect of the trade character with the public. Several commendatory talks on "Busy Buttons" followed.

The publication of the "Book of Standards" of the Section was announced for next year's work of the standards committee.

## ACCOUNTING SECTION

Work orders, cost vouchers, unit costs, and accounting necessary in connection with the installment plan of stock sales were some of the subjects occupying the time of the thirty or more gathered for the first session of the Accounting Section Tuesday afternoon. Committee chairmen announced that there were no reports to be made and most of the time was devoted to informal discussions. C. P. Stall of the Southern California Edison Company spoke at some length in support of the modification of the California system of accounts classification to conform more closely with the standard system adopted by a majority of those affiliated with the N.E.L.A. The system at present in use conforms with the system known as the federal system and was adopted because it provided better for those items incident to hydro developments.

A protracted and interesting discussion of billing machines, their advantages and application, took most of the time of the second session, Wednesday afternoon. This discussion centered around H. T. Terry of the Pacific Gas and Electric Company, who went into the subject quite fully and answered the multitude of questions fired at him.

## PURCHASING AND STORES SECTION

In the absence of F. W. Smith of the Great Western Power Company the session of the Purchasing and Stores Section presided over by C. A. Kelly of The Southern Sierras Power Company. The only business transacted was the reading of the minutes of previous meetings and the brief report of the Section activities.

## INSURANCE SECTION

Fire and earthquake insurance and reserves were the subjects of major interest dealt with by the Insurance Section under the chairmanship of Herbert Dewes of The Southern Sierras Power Company. Much comment was aroused by the information presented under that head.

## TRANSPORTATION SECTION

The initial year of service for the Transportation Section has shown conclusively that there is a definite field of endeavor for the Section, according to the chairman, S. B. Shaw of the Pacific Gas and Electric Company. At the first session, Tuesday, two papers were presented. The first of these was on Power Equipment and Labor-Saving



Devices and was read by V. W. Dennis of the Pacific Telephone & Telegraph Company in the absence of O. R. Cole of that company, who was chairman of a subcommittee studying that subject. The second paper, on Truck and Commercial Car Body Design and Selection of Equipment was presented by C. D. Weiss of the San Diego Consolidated Gas & Electric Company, chairman of that subcommittee. Discussion of the points raised in each of these papers was widespread.

Tires and the recording of data thereon was the subject occupying the center of the stage at the second session of the Transportation Section. An interesting paper on the subject was presented by P. H. Ducker of the Southern California Edison Company. The adoption of standard tire record forms is one of the things that the subcommittee is looking forward to, and toward that end a study of the various forms now used is to be made. Plans also were made for the circularizing of section members in order to further the work of any of the section's subcommittees and to spread the information gathered. A uniform schedule of classification is to be worked out in the future.

## WOMEN'S COMMITTEE, PUBLIC RELATIONS SECTION

With a registered attendance of more than two hundred, the women members and guests at the convention followed a varied and interesting program.

A two-hour session was held on Tuesday afternoon with Miss J. Frances Emans, Pacific Coast chairman, Women's Committee, presiding. Speeches of welcome to the women and appreciation of the work they have done and are doing were made by President Baurhyte and A. B. West. Miss Isabelle Davie, executive secretary of the Women's Committee, gave an enlightening report of the activities of the committee throughout the United States during the past few months. Miss Davie has charge of this phase of the work at N.E.L.A. headquarters in New York.

An outline of the accomplishments of women employees of the San Joaquin Light & Power Corporation in establishing widespread cordial contacts for the company was given by Mrs. Nira J. Letchworth of that company. Mrs. Ruth E. Creveling, librarian, San Diego Consolidated Gas & Electric Company, spoke on "The Printed Page and Public Relations." Attention was called to the value and necessity of spending a little more time on the perusal of current periodicals and books pertaining to those phases of the industry in which women actively are concerned. A tentative reading course for women employees was outlined.

### Women's Debut on Convention Program

This was the first Pacific Coast Electrical Association convention at which the women appeared on a general sessions program. At the public relations sessions Friday morning, Miss Emans reported on the work of her committee and its accomplishments in the field of public relations. Miss Isabelle Davie explained the various ways in which the Women's Committee is functioning, not only on the Pacific Coast but all over the country. Mrs. W. L. Deimling created much interest by telling in some detail the very practical program which has been carried out by wives of men in the electrical industry at Santa Ana. Mrs. Deimling is the wife of the Santa Ana district manager, Southern California Edison Company.

During the past year the Pacific Coast committee has accomplished an amazing amount of work of a most practical and far-reaching character it was brought out. President Baurhyte and other officers of the association spoke appreciatively of the faithful and efficient manner in which Miss Emans and her assistants have carried on the work, and heartily endorsed the program for the coming year.

### Many Entertainment Features Provided

Many attractive entertainment features were provided for the women attending the convention. On Tuesday afternoon a tea was given by Mrs. William Baurhyte at the Wilshire Country Club. A bridge luncheon and swimming party was given at the Casa del Mar, Santa Monica, on Wednesday. Following the public relations sessions Friday, Miss J. Frances Emans was hostess at a Women's Committee luncheon at the Biltmore. Brief talks were given by Miss Emans and Miss Davie. Miss Galvin, demonstrator for the Edison Electric Appliance Company, cited many interesting experiences which she had had in contact with the public.

## SPORTS AND ENTERTAINMENT

Entertainment for the men reached the zenith on Thursday afternoon when the annual golf tournament was conducted. Over one hundred delegates relaxed for the afternoon and followed G. E. Arbogast and his golf committee to San Gabriel Country Club where, following a buffet luncheon, they proceeded to balance previous mental exercise with physical exertion. Scores were of secondary importance, but a majority turned in cards indicating considerable practice and attention to the finer points. The H. M. Byllesby cup, open to players with a handicap of 18 and under, was won by J. S. Spurck, General Electric Company, with a gross score of 86, net 70. Mr. Spurck also took the low gross in Class A, thus winning a handsome golf bag. The Pelton cup, open to players with handicaps above 18, was awarded to R. S. Spilsbury, Newbery Electric Corporation, with a gross score of 92, net 70. R. C. McFadden, Southern California Edison Company, with a net score of 75 took the title to the jobbers central station trophy presented for competition among central-station employees by the jobbers of Los Angeles.

The class competitions were won by the following:

Class A—J. S. Spurck, low gross. Class B—R. Spilsbury, low gross. Class C—R. C. McFadden, low gross.

Kicker's handicap was won by Paul Overton, Los Angeles Gas and Electric Corporation, with a net of 71. R. C. Smith, Pelton Water Wheel Company, won second, and H. M. Pomeroy won third place. Seventy was drawn as par.

For the women delegates and guests the entertainment features started on Monday night with the informal dance in the music room. From that time on under the guidance of P. H. Booth's committee there were teas, receptions, bridge luncheons, visits to the moving-picture studios and dancing each evening until Friday, the evening of the annual banquet. The president's reception was held Tuesday evening.

## Mexican Projects Announced by J. G. White Interests

**A**MONG the irrigation and power projects recently announced by G. W. Caldwell, general manager of the J. G. White Engineering Corporation of Mexico, are projects in Lower California and the state of Sonora, in which power development is probable. The J. G. White Engineering Corporation of Mexico has contracts with the Mexican government for the construction of projects, largely in northern Mexico, which will cost approximately \$20,000,000, exclusive of the irrigation system and dam on the Mayo River in the state of Sonora, that will cost about \$10,000,000.

Power plants are to be installed upon the projects wherever feasible, it was announced by Mr. Caldwell. The Mexican government, beside making a budget allowance for the work, intends to buy the irrigable land at its market value and sell it to farmers who will live on it and put it in intensive cultivation.

Western projects included in the plans are: Lower California—irrigation of 25,000 acres of land on the Santo Domingo River, near San Quentin, by a dam and canals; Aguas Calientes—irrigation of 100,000 acres by 100-meter arch concrete dam and canal system on San Diego River; Michoacan—irrigation of 40,000 to 50,000 acres by construction of diversion and storage masonry dam on Rio Bravo; Durango—irrigation of about 30,000 acres from a completed earth dam and a canal system on the Guatamepe River; also a project upon the Saucedo River involving a masonry dam and canal system to irrigate 25,000 acres; Tamaulipas—irrigation of about 40,000 acres by small diversion dam and canal system on Monte River.

# Selling Should Accompany Service, Northwest Convention Told

**T**HE growing consciousness that the electrical industry is not only engaged in rendering an essential service but that, like any other business, it is faced with the important problem of selling the manifold uses of electricity to the public was the central theme of the nineteenth annual convention of the Northwest Electric Light and Power Association at the Davenport Hotel, Spokane, Wash., June 14-17, 1926. The three hundred members of the industry from Washington, Utah, Oregon, Idaho and Montana who attended the sessions were impressed by more than one speaker with the fact that, while the people of America enjoy more of the benefits of electricity than any other nation in the world, if the ultimate advantages of complete electrification are to be enjoyed by industry and in the home, workers in the electrical business must turn their attentions from the accounting, financing and engineering problems which have been so well solved and devote more energy and effort to the problem of sales.

Closely tied with this task of selling more and better electrical service is the question of public relations, many speakers pointed out. With the solution of the selling problem the industry may expect to see its public relations on a more satisfactory basis.

## Griffith Delivers Outstanding Address

Largely because it was more pertinent to the immediate problems facing the utility companies of the Northwest the address of Franklin T. Griffith, president, Portland Electric Power Company, Portland, was the outstanding one of the first general session Monday morning and of the entire convention. Taking as his text an utterance of the master of the Washington State Grange in a recent meeting of that body that all the water powers of the West are being gobbled up by the "power trust" to cause the flowing waters to fill the coffers of that



D. C. GREEN  
President-elect of the Northwest Electric  
Light and Power Association.

trust with a rain of gold, he showed how fallacious is such belief by pointing out some of the many restrictive regulations under which the utilities must do business. He urged that the electrical industry approach the duty of combating such attacks with a sympathetic understanding of the attackers' points of view, giving them credit for sincerity in their beliefs.

Beside reviewing briefly the year's work of the association, Lewis A. Lewis, president, urged a continued and closer co-operation between this geographic division and the staff of the N.E.L.A. "It is only by contact with these men that we are able to get the most out of the work that they are doing and to appreciate more fully the value of that organization to our industry," he said. Expressing his opinion that

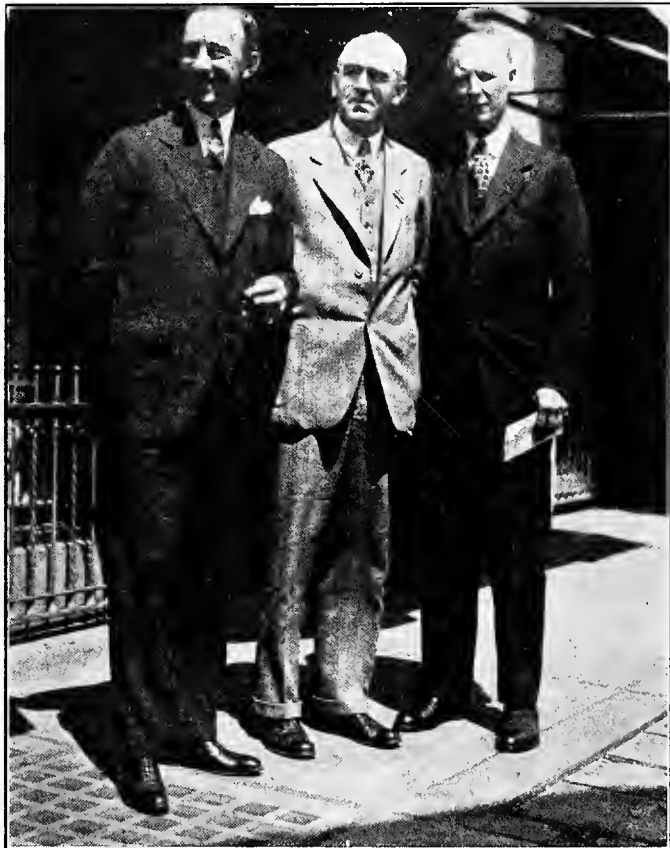
a greater continuity of action in the executive department of the association could be assured through the employment of a permanent secretary and through a system of rotation of officers so that each new president might know a year in advance that he was to become president, he recommended that the incoming executive committee give consideration to these opinions with the idea of determining whether or not they were feasible.

This session had been opened by a welcome to Spokane from Honorable Charles A. Fleming, mayor, and from D. L. Huntington, president, The Washington Water Power Company, to which Norwood W. Brackett, director of public relations, Puget Sound Power & Light Company, Seattle, responded on behalf of the association.

## Heed Talks Merchandising and Load-Building

At the second session, Monday afternoon, devoted to commercial activities and presided over by P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake City, and chairman of the Commercial Section, S. D. Heed, president, Electric Household Utilities Corporation, Chicago, and vice-

chairman, National Commercial Section, made a plea that the commercial departments of the utility companies be elevated to greater importance. Pointing out that the greatest selling job in the nation today is faced by the electrical industry, now only ten per cent sold, he urged that company sales managers be invited into the executive councils of their companies and that all members of com-



Three presidents—D. C. Green, new president of the Northwest Electric Light & Power Association; L. A. Lewis, retiring president; and R. F. Pack, new president of the National Electric Light Association.

mercial departments receive compensation commensurate with their worth to the company as obtains in other industries. He called attention to the intensive competition from the baker, delicatessen man, the laundry and the restaurant, showing how these businesses and others made inroads into kilowatt-hour sales in the home, and said that only similar methods employed by the commercial departments of the power companies would produce the results sought. Stating that annual appliance sales in recent years have not kept pace with the new market created each year, he lauded the direct-to-the-consumer method of merchandising by which the salesman carries appliances to the home teaching the home-owner how and why to buy them.

Reciting some of the achievements of the electrical industry, M. H. Aylesworth, managing director, N.E.L.A., who also addressed this session, stated that one of the chief reasons for the prosperity of the United States was that industry had been electrified so that four horsepower was now available to every working man, thus increasing the laborer's productive capacity and enabling him

to earn a surplus over and above his needs. He pointed out the close relationship existing between departments of the utility companies, and, illustrating the lack of harmony that in some instances has existed in the past, he made a plea for a better understanding of the fundamental economics of the business on the part of all departments.

Covering the general subject of "Does Co-operation Pay?" C. T. Hutchinson of the McGraw-Hill Company of California addressed the convention. In the course of his remarks he gave a general discussion of the activities and the characters of the Pacific Coast Electrical Association, the Pacific Electrical Supply Jobbers Association, the California Association of Electragists, the California Electrical Bureau, and also of the local electric clubs, leagues and contractors' organizations.

Through the California Electrical Bureau, he pointed out, has developed a means of co-ordinating the affairs of all of the associations devoted to certain classes within the industry and of making it possible to obtain an expression of the voice of the industry through representatives on the advisory committee of the bureau of members from each branch. The governing body of the bureau, he pointed out, is made up of twelve men, three representatives from each of the four branches of the industry, selected by that branch to represent them, representation which remains unchanged regardless of the contribution of that branch to the bureau.

He described the work of the bureau in promoting the Red Seal plan, in which the entire personnel of the California Electragists is engaged as volunteer workers. He told of the district plan whereby the entire state has been organized in the interests of the welfare of the industry as a whole.

"There can be no question but that co-operation pays," the speaker said, and went on to show among the advantages derived those of better understanding, mutual responsibility, tolerance and sales benefits. He also stressed the value of such co-operative effort on questions of the welfare of the industry as a whole through which political forces seeking the destruction of the industry may be met. A definite object to attain and something to do after starting were expressed as the two requisites for such organizations, and Mr. Hutchinson urged central stations to take the initiative in creating such co-operative bodies since they have the power, the means of financing and the greatest interest in their success.

#### Hughes Invited to Speak

Although not on the program at the commercial sessions, George A. Hughes, president, Edison Electric Appliance Company, Chicago, was invited to address the meeting and solicited the aid of manufacturers and manufacturers' representatives in combating inimical legislation directed toward the private power companies, stating that the question of political ownership was as much a problem for those dealing in electrical equipment as it was for those selling energy.

P. M. Parry, commercial manager, Utah Power & Light Company, reporting on the achievements of

the Commercial Section for the year, called attention to the successful completion of the range survey carried on by a special committee of the N.E.L.A. from this geographic division under the leadership of Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane, the final report of which was completed in time for the recent N.E.L.A. convention at Atlantic City and published as a report of the Commercial National Section. To inspire the commercial departments of Northwest power companies to a true conception of their responsibilities, Mr. Parry pointed to the opportunity of increasing kilowatt-hour sales through the development of new uses and the exploitation of new electrical devices as they are perfected, saying, "To do less would be to deprive our communities of their opportunities for advancement and we would fail to live up to our full responsibilities."

### Refrigeration and Industrial Heating Discussed

Directing the attention of the convention to two important activities of the Commercial Section, the chairman called for a discussion of some phases of the work of the refrigeration and power committees. J. F. Orr, sales manager, Idaho Power Company, Boise, calling attention to the excellent load-building qualities of and the vast market for the domestic electric refrigerator, and to the benefits accruing to refrigerator owners, stated that it was primarily the job of the central station to bear the expense of pioneering and developing this appliance. W. R. Putnam, vice-president and general manager, Idaho Power Company, expressed it as his opinion that there would be less sales resistance to the refrigeration idea than there was to electric cooking and that as more people became familiar with the use of the plants there would be less servicing to do. He urged complete co-operation

with the local ice manufacturers in territories where central stations were exploiting the sale of refrigerators, reciting an instance of a local ice business increasing under the stimulus of refrigeration advertising by the power company.

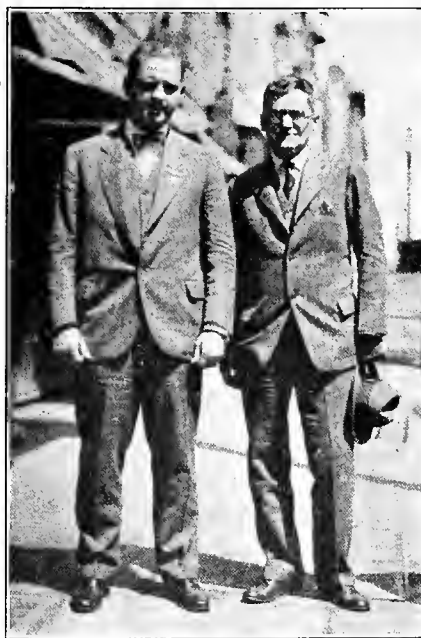
Industrial heating was discussed by J. D. Scott, commercial engineer, Portland Electric Power Company, Portland, saying that the West was far behind the East in the development of this load. He drew attention to the large possibilities in this field, characterizing it as the most highly specialized field in the load-building operations of power companies and that requiring the highest type of salesmanship. Taking up one branch of the subject, George P. Trayner, Utah Power & Light Company, gave some operating statistics on commercial cooking and baking installations, indicating that such business was producing very satisfactory results in his territory.

### Pack and Carpenter Touch on National Aspects

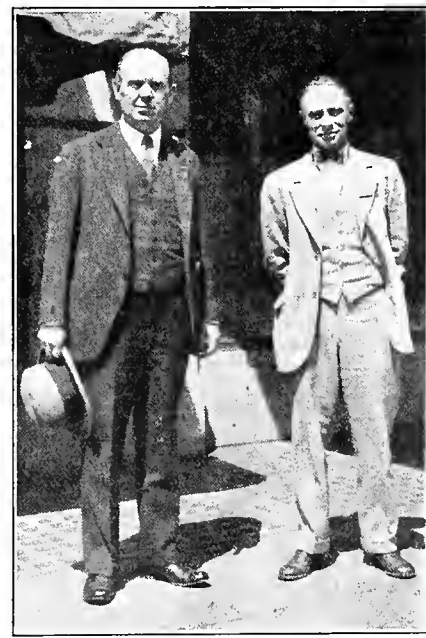
The convention was honored by the presence of R. F. Pack, president-elect of the N.E.L.A., who addressed the third general session Tuesday morning, bringing a promise of continued co-operation with the Northwest geographic division by the national organization. "The great development of the electrical industry," he said, "could not have been effected without the national association, and the close co-ordination between the work of the local committees and the national committees has been responsible in part for the harmony existing in all branches of the industry." Sensing the national situation closely, he stated that among the three factors in our industrial life, the laborer, farmer, and business man, a more united opinion against political ownership was being manifested. He exhorted the industry to conceive of its obligation to make home life more attractive and com-



Miss Isabelle Davie, national chairman, in perfect accord with Mrs. L. A. McArthur, Northwest chairman of the Women's Committee, as they discuss women's place in the industry.



S. D. Heed, president of a large appliance manufacturing company, told what greater commercial development would accomplish, and L. A. McArthur showed what moving pictures can do.



When Commercial meets Technical—P. M. Parry, chairman Commercial Section, and Z. E. Merrill, chairman Technical Section, uphold the two chief fundamentals of the industry.



fortable to offset the influences now leading the people away from the home.

"It is no coincidence that the center of electric load and the center of industrial development in the United States are only twenty miles apart in Ohio," said W. M. Carpenter, of the engineering staff of the N.E.L.A., supporting his contention that the growth in the electrical industry had been brought about largely by the growth of industrial load. Mr. Carpenter, though not on the regular program, had been invited to deliver a message to the convention from his staff. He explained how one department, of which he is the head, studies the trends in industry over the entire country brought about by changes in hours of labor in certain localities or by a revision of freight rates or other causes.

#### McArthur Shows Moving Picture

"Living up to our obligations in the past implies that we are going to live up to them in the future," said L. A. McArthur, vice-president and general manager, Pacific Power & Light Company, Portland, after discoursing on a number of benefits which the public had derived from the broad-gaged policy adopted by utility companies under private initiative on the Pacific Coast. He showed how interconnection had increased load factor and had brought reliable service to small rural communities and to a greater percentage of farms than obtains in any other section of the country. His remarks were introductory to the presentation of an animated moving picture, prepared by the engineering department of all the Western companies and filmed in a Hollywood studio, which illustrated the growth and accomplishments of the electrical industry in the eleven Western states under private initiative.

In his report on the work of the Technical Section, to which this session partially was devoted, Z. E. Merrill, chairman of that section, and assistant general manager, Mountain States Power Company, Albany, Ore., mentioned some of the high lights of the year's activities, such as the marked strides made in eradicating radio troubles due to the operation of power systems, and the steps taken toward the solution of the inductive co-ordination problem with the telephone companies. He stressed the fact the section had attempted to induce its members to secure a broader general knowledge of financial, commercial, and public-

relations problems so that they could continue to improve engineering methods, having in mind the fundamental economic principles upon which the industry must progress.

#### Radio Co-ordination

Co-ordination of effort among the utility companies, the equipment manufacturers and the listeners to radio broadcasting in attempting to improve radio conditions is necessary, in the opinion of L. H. Kistler, superintendent meter department, Northwestern Electric Company, Portland, who spoke on this subject also at this session. He stated further that through battery charging radio had added a very desirable load to the lines of the central station and in addition had increased the use of light and appliances, thus increasing residential revenue, and that a studious attention to the radio fan's troubles could be made a source of good-will building, the value of which should not be overlooked.

#### Rural Electrification

Report of excellent progress in the work of the committees on the Relation of Electricity to Agriculture in Washington, Oregon and Idaho featured the fourth general session presided over by W. H. Ude, director of public relations, The Washington Water Power Company, and chairman of the Public Relations Section. Eighteen months work of the Washington committee was reported by E. C. Johnson, dean of the college of agriculture, Washington State College, Pullman, who stated that the first year had been given over to a survey of the agricultural districts of the state to determine the extent to which electricity was utilized in farming and in the farm home. "In the proper application of electric service to the farm it is now evident that we must change the organization of the farm and its methods and machinery, as well as the state of mind of the farmer, if we are to be successful in complete electrification," said Dr. Johnson.

The Oregon report, delivered by J. T. Jardine, director of experiment stations, Oregon Agricultural College, Corvallis, indicated that the program is well advanced in that state where experiments have been conducted by irrigating electrically hops and truck farms to determine if the additional yield would make electric irrigation economical. Economical application of electricity to poultry-raising, brooding and dairying also has been demonstrated.



In front of the Davenport Hotel, Spokane, Wash., the delegates and guests of the Northwest Electric Association convention.



Dr. Jardine stated that the principal difficulty thus far encountered has been the inability of the farmer in many cases to finance the purchase of equipment for the electrification of his property.

Prof. M. R. Lewis, head of the agricultural engineering department, University of Idaho, Moscow, reported for the Idaho committee in the absence of E. J. Iddings, dean and director, who was unable to be present. "Idaho farmers use 36,000,000 kw-hr. annually for irrigation pumping and 5,000,000 kw-hr. for other purposes," he said in explaining that electric service in the home closely follows its use for irrigation. He revealed how the low rate per kilowatt-hour in cases of farmers' mutual distribution systems is arrived at when he said that the users "write off in their own minds" the cost of lines and transformers.

#### Dr. White Compliments West on its Program

"Here is a territory where rural electric service is very much a reality," said Dr. E. A. White, director of the National Committee on the Relation of Electricity to Agriculture, in complimenting the state committees in this geographic division. "Since my visit here two years ago I note a wonderful advancement in the electrification programs. Americans have set a standard in world history for the development of the farm, and you electrical men are seeing to it that the man who remains on the farm is served. That is a work of national and international importance."

#### Chairman's Report on Public Relations

Foremost among the active committees of the Public Relations Section is the Women's Committee, headed by Mrs. L. A. McArthur, Portland, stated the report of W. H. Ude, section chairman, in announcing that a half-day session of the convention had been given over to that committee's activities. As a result of the inception of the committee work two years ago there are now a number of women in the industry in the Northwest who are able to discuss with their friends and neighbors almost any public-utility subject that requires explanation, and this should be of continuing advantage to the companies in telling their story to the people. The work of the other committees was reviewed in brief, and a recommendation was made that a new committee on advertising and publicity be created as part of the Public Relations Section.

#### Hodges Pleads for Common Sense

A plea for "downright friendliness and applied common sense in public relations work," was heard in the address of Earl W. Hodges, director of public relations, Henry L. Doherty Company, New York. "When we convince Mr. Public Citizen that we too are good citizens and want to be friendly, we have gone a long way toward our purpose," he said. He urged the utility executive to get out in front and meet his customers and mix in civic club work, and assured them that such organized friendliness and application of common sense would carry the public-relations work to the goal.

#### Onken Speaks on Interdependence

The relation of electricity to American industrial progress and development was the topic of an inspirational address by W. H. Onken, editor, *Electrical World*, New York, featuring the fifth general session Wednesday morning. He showed the indispensability of electric power in the economical production of a multitude of products in everyday use contributing to health and happiness, and said, "One need never be ashamed of selling electricity or of manifesting boundless faith in its possibilities. Everyone connected with the electric light and power industry from the ditch digger, lineman and office boy to the engineer and chief executive has reason to be proud of it, for electricity has made the greatest contribution to twentieth century civilization. Our present greatness and high standards of living would be impossible without it."

#### Financial Structure Discussed

An illuminating discussion of the financial structure of the industry was the contribution to this session by W. H. Lines, vice-president in charge of railways, Portland Electric Power Company, Portland, in which he illustrated the factors entering into the problem of how additions and betterments should be financed and to what extent they should be undertaken from year to year. He stated that a safe and satisfactory ratio of bonds and stocks was 60 per cent mortgage bonds, 20 per cent preferred stock and 20 per cent common stock. In describing a scientific method of determining the amount of annual capital expenditure he illustrated the use of certain "yardsticks" of measurement, by which the proper ratio of net earnings to capitalization might be maintained.



Light & Power Association gathered for the usual convention photograph ensemble.

### Accounting Section Report

A. J. Johnstone, auditor, Portland Electric Power Company, Portland, chairman of the Accounting Section, in reporting on the activities of his section for the year told of co-ordinating the work of the geographic sections in relation to the Accounting National Section and of the mid-season meeting held in Portland in February, 1926, by his section, the first ever attempted by the accountants of this



Leaders in the Women's Committee work—Stella Dorgan, Mountain States Power Company, Albany, Ore.; Mrs. L. A. McArthur, Northwest chairman; Nelle Duffey, Puget Sound Power & Light Company, Seattle; Mary K. Walsh, The Washington Water Power Company, Spokane; and Isabelle Davie, National chairman, New York.

division. He recommended a continuance of such meetings and the making them a part of the accepted routine.

Because of lack of time at this session, the paper on budgetary control, prepared by J. C. Hawkins, assistant treasurer, Northwestern Electric Company, Portland, was not read. However, it will be included in full in the proceedings of the convention and thus will be made available to all those interested in controlling the management of business along budgetary lines.

### Aylesworth Addresses Ad Club

At a luncheon following this session at which the Spokane Advertising Club was host to the convention delegates, M. H. Aylesworth carried to the people of the Northwest a vital message when he stated that the electrical industry, in discharging its obligation to the nation, has evolved a solution to the perplexing Muscle Shoals problem in that thirteen power companies of the southeastern states co-operated in a bid to develop and distribute Muscle Shoals power and manufacture fertilizer at a lower cost than any other bidder and that their proposition has been accepted by the congressional committee. Stating that advertising creates interest, encourages initiative, protects the rights of property, and is the standard-bearer of industrial honesty, he told of a number of reasons why the electrical industry had begun to advertise, and as-

sured his hearers that as long as the existing condition of regulation prevailed in the electrical industry that industry would continue to fulfill its obligations to the public so that even greater accomplishments could be expected.

### Women Instruct and Entertain

The activities of the comparatively new Women's Committee of the Public Relations Section was the feature of the sixth general session held Wednesday afternoon. Isabelle Davie, secretary, National Women's Committee, N.E.L.A., urged that executives encourage the women of the organization to take an interest in the affairs of the utility companies and attempt to interest the feminine public in the electrical industry. Pointing out the advantages accruing to company organizations from having satisfied employees, she explained how women's committees had been successful in bringing about those desired results.

Reporting briefly on her administration as chairman of the Women's Committee of this geographic division, Mrs. L. A. McArthur said that headway had been made in some sections toward interesting the wives of men employees in the work as well as women employees, and she recommended that such practice continue in the future. She also advocated including the women employed in electrical supply companies along with those of the utility companies. To give an idea of the kind of work done in local organizations, she introduced Mary K. Walsh, chairman of The Washington Water Power



Women in convention—Some of the representatives of the women of the Northwest in attendance at the convention in Spokane, just before their special session Wednesday.

Company committee, and Stella Dorgan, heading the Mountain States Power Company committee, each of whom gave a short report of the activities of their respective organizations.

Entertainment furnished by the women at this session included songs by Nelle Duffey, chairman of the Puget Sound Power & Light Company's Women's Committee, Seattle, and a playlet by Mrs. E. H. Collins, Maud McDonald and Alfernia Culler, members of the Spokane Women's Committee.

### Green Elected President

At the executive session held the same afternoon, D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake City, was elected president of the association for the ensuing year. Vice-presidents named by the members in their respective states were: Oregon—George L. Myers, assistant to the president, Pacific Power & Light Company, Portland; Washington—Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle; Idaho—R. B. King, superintendent, Idaho Power Company, Boise; Utah—P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake City; Montana—W. B. McDonald, manager, Mountain States Power Company, Kalispell.



Two cups that cheer C. L. Hill of Tacoma as he receives them from John B. Fisk, chairman of the golf committee, as winner of them at the annual tournament, June 17, at Hayden Lake course. The cups are the Manning-Bowman and Kilowatt Cups.

The following members of the executive committee at large were named: to represent the manufacturers—A. S. Moody, manager, General Electric Company, Portland; to represent the utilities—R. M. Boykin, manager central district, Puget Sound Power & Light Company, Seattle. Franklin T. Griffith, president, Portland Electric Power Company, Portland, and John B. Fisk, consulting engineer, The Washington Water Power Company, Spokane, were elected to honorary membership of the executive committee.

### Golf Cups to Tacoma

Both the Kilowatt Cup and the Manning Bowman Cup were won by C. L. Hill, superintendent of power, southwestern district, Puget Sound Power & Light Company, Tacoma, in the golf tournament held at the Hayden Lake course on Thursday.

## Utility's Plan for Disposal of Traded-in Coal and Wood Ranges

FROM the time The Washington Water Power Company first introduced the electric range in its territory, it decided that the success of these ranges depended on their use, and in order to promote this idea it sought to remove all other non-electrical cooking equipment from the kitchen. This naturally forced the company to take in second-hand ranges in trade.

Each salesman was carefully instructed as to the value of the coal and wood ranges so that he could place a value on them while talking with the customer. These ranges were taken in to the main office and put in a basement display room where they were priced and sold. In order to stimulate the sale of these ranges advertisements were run in the papers from time to time, and the salesmen disposed of some where electric ranges could not be sold.

During the first few years of electric range selling, this method of disposal worked very well although there was always a considerable loss due to enthusiastic salesmen over-estimating the value of equipment which was purely junk. However, as the sales of electric ranges increased both in the city and the surrounding territory the problem of selling these second-hand ranges became acute, and late in 1924 The Washington Water Power Company found itself with a great many coal and wood ranges on hand and no market for them. As some of these ranges were in very bad shape, it was decided to hire a man to put them all in first-class condition after which they would be sold with a one-year guarantee by the power company.

Arrangements were made to have this job done on a time-and-material basis. The work proved so satisfactory that a plan was evolved whereby the man who did it took over the entire business. Now the salesmen co-operate with him in setting values on the coal and wood ranges which they take in and these ranges are delivered to his store. The Washington Water Power Company pays him a fixed charge for cleaning the ranges as well as the cost of repair parts and allows him a 10 per cent commission for the selling, and he pays the store rent.

In selling these ranges he is allowed to extend terms without credit approval provided he gets 25 per cent down. If this is not satisfactory to the customer, he may take the matter up with The Washington Water Power Company's credit department, and if it finds the credit is good, terms are extended over a period not to exceed twelve months. All collections and billing are done through The Washington Water Power Company.

This plan of coal and wood range selling has been the only satisfactory one that The Washington Water Power Company has worked out. Besides relieving the company of all responsibility of selling and delivering, it has been a means of getting from fifteen to thirty dollars more for each range over what had been secured previous to the time of adopting this plan.

# IDEAS FOR THE CONTRACTOR

## Electrical Estimating for the Contractor — XII

### Working Knowledge of Design and Types of Gears Used for Motor Connection Valuable in Industrial Field

By J. R. WILSON\*, Quality Electric Company, Los Angeles.

Motor connection by means of gearing is becoming very common in industrial plants of today. Owing to lack of space in which to get the proper distance between shaft centers, line shafts, too, sometimes are gear-driven. Individual machines driven by gear-connected motors are exceedingly common. Lathes, drill presses, compressors, winding machines and similar equipment are examples of gear applications. The estimator should have a working knowledge of gear types and design in order to advise his clients as to the practicability and possible cost of this mode of connection.

Gears may be divided roughly into the following types: Spurs, internal, bevel, miters, worm, spur mortise, bevel mortise and miter mortise.

They may be made of cast iron, cast steel, wrought steel or bronze. The horsepower transmitted by gears varies with the material of which the gear is made and also whether the teeth are cast or cut.

The horsepower ratings for cast tooth gears are calculated from the Lewis formula, stress factors being used which have been found to be correct. These ratings are for service where little or no shock is encountered. The following factors should be used where gears are made of other materials than cast iron:

Cast steel, multiply tabular hp. value by 2.50.

Cast bronze, multiply the tabular hp. value by 1.45.

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Half-shrouded pinions, multiply the tabular hp. value by 1.15.

Full-shrouded pinions, multiply the tabular hp. value by 1.30.

Cast tooth gears should be used only for moderately slow speeds, with 900 ft. per min. pitch line velocity as a maximum. For higher speeds cut tooth gears should be used. The maximum speed for cut tooth gears is recommended as 2,000 ft. per min. Mortise gears can be run at a maximum of 2,500 ft. per min. Tables 6, 7 and 8 give horsepower ratings for gears.

Where the required gear speeds are found to be beyond the recommendations of the tables, it will be necessary to introduce some form of double-reduction gear mechanism. One of the best of these is the Sykes Herringbone type and data on this reducer are given in Table 9.

The formula used in computing gear ratios is somewhat like that used for pulleys and may be expressed briefly as follows:

$T$  = No. teeth—Gear.  
 $t$  = No. teeth—Pinion.  
 $r$  = Rev.—Pinion.  
 $R$  = Rev.—Gear.

Ratio,  $TR=tr$ , from which any one of the four factors can be found if the other three are known. Circular pitch is the distance in inches from the center of one tooth to the center of the next on the pitch line. Diametral pitch is the number of teeth to each inch of pitch diameter.

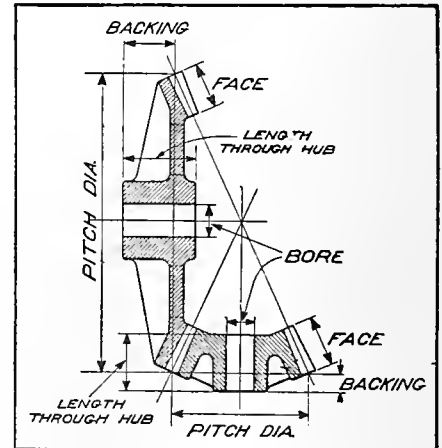


Fig. 2. Cast tooth bevel and miter gears. —Bevel gears operate only in pairs, and it is first necessary to choose the correct ratio of driving to driven shafts, then determine the size of the shaft for small wheel. With this information at hand a suitable set of gears easily can be found to transmit a certain amount of horsepower under a given number of revolutions.

In the drawing above, it will be noticed that the backing is the distance from the pitch line of the gear, measured parallel to the shaft, to the end of the hub. The end of the hub is on what is known as the hub side of the gear, or that side which takes the thrust of a pair of gears, the face side denoting the opposite end of the hub.

In order for a gear drive to be successful great care must be taken to see that the teeth mesh properly. The foundation must be solid so that the adjustment will remain permanent, and the pitch line speed must not be too high. For small motors, gear speeds of 1,800 ft. per min. have been used successfully, but 1,500 ft. per min. will be more liable to give continuous and satisfactory service. For large

Table 7

(Horsepower Transmitted by Cast-Tooth Gears)

(The horsepower which safely can be transmitted by gears varies with the speed at the pitch line. Doubling the pitch line speed does not double the power, as a greater factor of safety must be used with high speeds. Gears with cast teeth should not be used at high speeds.)

Pitch Inches	Face Inches	Speed in Feet per Minute at Pitch Line					
		100	200	300	500	750	1250
1 1/2	1 1/2	1.74	2.59	3.20	4.80	5.69	6.49
1 1/2	2 1/2	3.06	4.67	6.10	8.55	11.36	13.72
1 1/2	3 1/2	4.13	6.31	8.23	11.54	15.33	18.52
1 1/2	4 1/2	5.35	8.19	10.67	14.96	19.88	24.01
1 1/2	5 1/2	8.26	12.60	16.47	23.08	30.66	37.04
1 1/2	6 1/2	11.78	17.99	23.45	32.91	43.73	52.82
2	6	14.69	22.44	29.28	41.03	54.52	65.84
2 1/2	7	19.28	29.50	38.40	53.85	71.50	86.42
2 1/2	7 1/2	22.95	35.06	45.70	64.10	85.20	102.90

Table 8  
Horse Power of Bevel and Miter Gears

Pitch Inches	Face Inches	Speed in Feet per Minute at Pitch Line					
		100	200	300	500	750	1250
1 1/2	1 1/2	1.14	1.75	2.24	3.36	3.92	4.48
1 1/2	2 1/2	2.14	3.22	3.96	5.70	7.95	9.60
1 1/2	3 1/2	2.89	4.34	5.34	7.69	10.73	12.97
1 1/2	4 1/2	3.75	5.63	6.93	9.98	13.91	16.51
1 1/2	5 1/2	5.14	7.73	9.51	13.67	19.08	23.05
1 1/2	6 1/2	7.50	11.26	13.85	19.93	27.82	33.62
2	6	9.43	14.16	17.41	25.06	34.98	42.28
2 1/2	7	12.53	18.83	23.15	33.31	46.50	56.20
2 1/2	7 1/2	15.00	22.32	27.70	39.87	55.65	67.24

Table 9

(Double Reduction Sykes Herringbone Gear Reducers.)

(The horsepower ratings given in this table are intended for smooth and steady service. Where the loads are fluctuating or subject to shocks, a liberal allowance must be made in the selection of the proper drive.)

Centers of Shafts	High Speed Shaft R.P.M.	Ratio							
		11	15	20	25	30	40	50	60
		Horse Power							
6"	300	10	7	5	4	3	2		
	600	18	12	9	7	5	4		
	900	25	17	13	10	8	6		
	1200	30	22	16	13	10	8		
	1500	34	25	19	15	13	10		
	1800	37	28	22	18	15	12		
8"	300	14	11	8	6	5	4	3	2
	600	28	20	15	11	9	8	6	5
	900	41	28	21	15	12	10	8	7
	1200	52	35	25	18	14	11	10	8
	1500	61	41	30	21	16	12	10	8
	1800	65	45	33	24	18	13	10	8
10"	300	23	16	11	9	8	6	5	4
	600	43	30	22	18	15	11	9	8
	900	62	43	31	25	20	15	12	11
	1200	75	54	38	30	24	19	15	13
	1500	83	61	45	35	27	21	18	15
	1800	90	68	52	40	30	23	20	17
12"	300	32	24	18	16	13	10	9	8
	600	60	45	35	30	25	19	16	14
	900	85	66	50	42	35	27	22	18
	1200	110	85	63	52	43	34	27	22



Table 6

(Horsepower and Working Loads of Cut Cast-Iron Spur Gears.)

Under the heading W. L. we give the Working Load or number of pounds of power-transmitting strain which safely can be brought on each inch width of tooth of a cut cast-iron gear or pinion of the size indicated at left of table, when it is running at the speed listed at top. Under the heading HP this is converted into horsepower transmitted at the speed named. These figures should be multiplied by the width of working face in inches, for the power of the gear in question. The feet per minute pitch line equals pitch diameter in inches multiplied by revolutions per minute and by .2618.)

Diametral Pitch	Arc Pitch	No. of Teeth	SPEED OF PITCH LINE—Ft. per minute											
			100		200		300		600		900		1200	
			W.L.	H.P.	W.L.	H.P.	W.L.	H.P.	W.L.	H.P.	W.L.	H.P.	W.L.	H.P.
10	.3142	12	90	.27	79	.47	70	.63	53	.96	42	1.15	35	1.27
		20	120	.36	105	.63	94	.85	70	1.27	56	1.53	47	1.71
		40	145	.44	127	.76	113	1.02	85	1.55	68	1.86	56	2.04
		60	152	.46	133	.80	119	1.07	89	1.62	71	1.94	60	2.18
		130	160	.49	140	.84	124	1.12	94	1.71	74	2.02	62	2.26
8	.392	12	113	.34	98	.59	87	.78	66	1.20	52	1.42	44	1.60
		20	150	.45	130	.78	116	1.04	87	1.58	70	1.91	58	2.11
		40	180	.55	158	.95	141	1.27	105	1.91	84	2.29	70	2.54
		60	190	.58	165	.99	148	1.33	110	2.00	88	2.40	74	2.69
		130	200	.61	174	1.04	155	1.40	115	2.09	92	2.51	77	2.80
4	.785	12	225	.68	195	1.17	175	1.58	130	2.36	105	2.86	87	3.16
		20	300	.91	260	1.56	230	2.08	175	3.18	140	3.82	116	4.22
		40	360	1.09	315	1.89	280	2.52	210	3.82	170	4.64	140	5.09
		60	380	1.15	330	1.98	295	2.68	220	4.00	177	4.83	147	5.35
		130	400	1.21	350	2.10	310	2.79	230	4.18	185	5.05	155	5.64
3	1.047	12	300	.91	260	1.56	232	2.08	175	3.18	140	3.82	116	4.22
		20	400	1.21	350	2.10	310	2.79	232	4.22	185	5.05	155	5.64
		40	480	1.45	420	2.52	373	3.36	280	5.10	225	6.14	187	6.80
		60	503	1.52	440	2.64	391	3.52	295	5.37	235	6.42	196	7.13
		130	530	1.61	462	2.77	411	3.70	310	5.64	248	6.77	206	7.50
2	1.57	12	450	1.37	390	2.34	350	3.15	260	4.73	209	5.71	174	6.33
		20	600	1.82	520	3.12	467	4.20	350	6.37	280	7.64	232	8.44
		40	720	2.18	630	3.78	560	5.04	420	7.64	348	9.50	280	10.20
		60	760	2.30	663	3.98	592	5.33	442	8.05	355	9.70	295	10.72
		130	795	2.40	695	4.17	619	5.57	462	8.40	370	10.10	309	11.23
1½	2.09	12	595	1.80	520	3.12	462	4.16	348	6.34	278	7.59	230	8.37
		20	800	2.42	700	4.20	620	5.58	466	8.47	372	10.15	310	11.28
		40	963	2.92	840	5.04	750	6.75	560	10.20	450	12.28	372	13.52
		60	1010	3.06	880	5.28	780	7.03	585	10.65	470	12.82	390	14.20
		130	1060	3.21	925	5.55	820	7.38	617	11.22	493	13.44	410	14.90

Some of the more common items overlooked include: ground connection left off, bushings left off here and there; conduit or outlet boxes not fastened; outlet boxes back to back in partitions with no nipples for the interconnecting wires, leaving wires in contact with ragged edges of boxes; conduit service head turned so that the service wires project at an angle; the leaving of a fixture unsoldered or a point untaped; or the connections hanging out of a fixture canopy.

In practically all of such cases the inconvenience and expense of sending a man back on the job and the inspector's time may be saved by a careful recheck of the job before it is left as completed. Returning to a job usually represents a dead loss to the contractor and rechecking offers a method of eliminating this loss.

Stamp on Shop Orders Aids Assembly of Repaired Motors

Repaired motors which have been worked on by several mechanics sometimes are difficult to reassemble. As a means of saving time and aiding in the assembly of motors, a rubber stamp has been devised by the California Electric Works, San Diego electrician.

This stamp is placed on every shop order for motor work, and the necessary information is obtained at the time a motor is received. The stamp is made to represent the outline of a motor as one would view it from above.

The essential information which is indicated on this diagram includes: the pulley end and the dimensions of the pulley; the direction of rotation; the side of the motor on which the push screws on the base are located; the side on which the feed wires enter the motor; the make; the number; the horsepower; the voltage; the speed, and the phase. By referring to Fig. 1 it may be seen how easily and quickly all of this information may be noted or indicated.

Regardless of the number of hands through which the various parts of the motor may pass in the course of repair, any mechanic may assemble the motor properly without delay. Proper assembly is especially important when the motor has been sent in from an outlying district. Otherwise serious delays may result from wrongly assembled motor being returned to the owner.

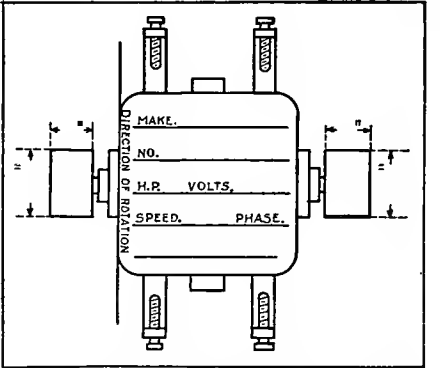


Fig. 1. A rubber stamp is used to imprint this diagram on every shop order for motor repair work in the California Electric Works, San Diego. It is an aid in assembling motors which have been worked on by several mechanics in the course of their repair.

Table 10

# GEAR FORMULAE

## FACTORS TO BE FOUND

Factors Given	Diametral Pitch	Circular Pitch	Number Teeth	Outside Diameter	Pitch Diameter
	P	P	N	D	D'
Diametral Pitch	P	$\frac{3.1416}{P}$			
Circular Pitch	P	P			
Teeth and Pitch Diameter	N	D'	$\frac{N+2}{2}$		
Teeth and Outside Diameter	N	D	$\frac{3.1416(N+2)}{P}$		
Teeth and Diametral Pitch	N	P	$\frac{N+2}{2}$		
Teeth and Circular Pitch	N	P	$\frac{N+2}{2}$		
Teeth and Addendum	N	S	$\frac{S(N+2)}{P}$		
Circular Pitch and Outside Diameter	P	D	$\frac{3.1416D}{P}$		
Circular Pitch and Pitch Diameter	P	D'	$\frac{3.1416D'}{P}$		
Diametral Pitch and Pitch Diameter	P	D'	$\frac{D'}{P}$		
Diametral Pitch and Outside Diameter	P	D	$\frac{D}{P}$		

## FACTORS TO BE FOUND

Factors Given	Working Depth	Whole Depth	Thickness at P. Line	Root	Addendum	Clearance
	W	W'	t	r	A	f
Diametral Pitch	P	$\frac{2}{P}$	$\frac{2.157}{P}$	$\frac{1.571}{P}$	$\frac{1}{P}$	$\frac{.157}{P}$
Circular Pitch	P	$\frac{6.566}{P}$	$\frac{6.566}{P}$	$\frac{3.533}{P}$	$\frac{1.571}{P}$	$\frac{.047}{P}$

Diametral Pitch (P) is the standard of measurement, and is equal to the number of teeth for every inch of pitch diameter.

Circular Pitch (P') is the distance from the center of one tooth to the center of the next tooth, measured along the pitch circle.

3 P. or Three Pitch means 3 diametral pitch.

3 P. or 3 inch Pitch means 3 inch circular pitch.

Gear Centers—the distance between centers of two gears is found by adding the number of teeth together and dividing half the sum by the diametral pitch.

motors a maximum speed of 1,200 ft. per min. is very good practice. Above 1,200 ft. per min. Micarta pinions should be used in order to give quiet operation. Under certain conditions even speeds as low as 800 ft. per min. may produce noisy operation.

Motors of 75 hp. at 850 r.p.m. are considered the limit for good practice in two-bearing general-purpose motors. Above this horsepower or at higher speeds, for gear drive an outboard bearing is recommended. To reduce noise and hammering the pinion should be placed as near as possible to the motor bearing. Table 10 gives some valuable data pertaining to gears, while Fig. 2 shows very clearly the terms used in designating the parts of bevel and miter gears.

Editor's Note.—The author is indebted to the Link Belt Company for tables and diagrams used in this article.

Save Expense by Checking Job Before Leaving It

"Haste Makes Waste." This is especially true in the case of flat and bungalow jobs which frequently are left in an incomplete state through haste in finishing up. A careful check of the work before leaving it will prevent the inconvenience and expense of making connections later.

## Electrical Safety Orders Effective in California

### Industrial Accident Commission Rules Are the Accepted Standard for Wiring Installations

By G. E. KIMBALL, Mechanical-Electrical Division, Industrial Accident Commission

On Sept. 1, 1925, the Electrical Safety Orders were made effective in California, and they are now the accepted standard for installing wiring and guarding practically all electrical equipment in the state. Not only are the orders being observed in places of employment over which the Industrial Accident Commission has jurisdiction, but they also are being applied and enforced in other places by municipal electrical inspection departments. If the orders are effective in reducing and preventing electrical accidents among employees in the industries they should be equally effective in preventing similar accidents to the employer and his family in their homes. Many inspection departments are enforcing the Electrical Safety Orders in all places under their jurisdiction, as well as in places of employment.

This co-operation has been obtained largely through the California Association of Electrical Inspectors, which meets annually to clear up problems in connection with the uniform interpretation of the National Electrical Code and the Electrical Safety Orders, as well as for the purpose of standardizing local inspection requirements. Through the efforts of this association a long step has been taken toward the adoption of uniform electrical regulations by the various cities.

The department's engineers frequently are asked whether or not an employer derives benefits in his plant from corrected electrical installations in addition to reducing electrical accidents. The answer to this question, as given by the manager of one large plant which has been inspected, is given here for your consideration.

He admitted frankly that when the inspection of his plant first was made they rather resented the order to correct the old work. When he learned from his plant electrician that the required corrections would cost at least a thousand dollars, he decided to go into the matter thoroughly. Before going ahead with the job, an electrical engineer was called in and instructed to check the estimate he had received from his electrician, and at the same time to see what could be done with certain other power problems which were confronting them. The engineer made the survey and came back with a report that the one thousand dollars would cover the cost of making the required corrections for safety, but that several hundred dollars a year could be saved readily by the expenditure of several times the original estimate in a rearrangement of the power distribution and motor equipment. He reported that it was costing the plant a good many dollars each month in power losses through wasted energy in overloaded transformers and in circuits supplying power to motors located beyond the limits of economical distribution. He further explained how the voltage, speeds and efficiencies were affected seriously by inadequate

wiring and in his report recommended many changes throughout the distribution system beginning with the outgrown and overloaded transformer equipment.

Other economies were to be effected by installing individual motors on a number of intermittently operated machines which were driven from line shafting where a large part of the energy of the motors was expended before reaching the machines. The engineer's rough report so interested the plant manager that he was engaged to make a complete survey of the plant and report on a plan for rewiring and for revised power application which would meet the requirements for safety and at the same time make the saving promised.

The survey was made and the plan submitted. Briefly, it entailed the building of a transformer room and a main switchboard at a point near the distribution load center and the construction of branch distribution centers at various points throughout the plant, from which motors could be served economically through comparatively short conductors, using wire of adequate carrying capacity and locating the protective equipment and control devices in safely and readily accessible places. Motors were shifted in several places, the larger units being assigned to machines which were undermotored and many of the smaller motors being reassigned to machines for which they were better adapted.

The plan was carried out. Almost from the beginning of the change the management could notice a difference in operation cost and production economies. The electrical equipment be-

came the pride of the plant and instead of being considered a necessary evil incident to operation it was recognized as a prime factor in the business of making profits.

When he was asked if the new arrangement had decreased the number of electrical accidents, the manager replied:

"The strange part of it is electrical accidents on the old installation were not frequent. We would run along for months at a time without any serious cases and they were almost always electric burns, with once in a while a case of temporary blindness from a flash. Shocks seldom were reported to the office and they had to be rather serious before we would hear of them at all. If an employee did get a jolt, he usually blamed himself for touching a live wire or bare conductor. He never seemed to blame the company for not having these parts properly enclosed and guarded. We found also with the new arrangement that the total number of general accidents fell off remarkably. There were several reasons for this, but we are sure it was largely due to the fact that a better lighting system had been installed along with the other corrections. Good lighting helps toward better 'housekeeping,' and better 'housekeeping' automatically removes many slipping, tripping and falling hazards."

In that plant the management was pleased not only with the performance of the rewired electrical equipment but also with the increased interest the employees seemed to be taking in the work they were doing under the improved conditions. There is every reason to believe that the improved conditions will go far toward perpetuating harmonious relations. At any rate it is a source of satisfaction to the commission's engineers to know that in the course of their duties they are creating benefits for the employers while requiring protection for their employees.

## REWARD

A Reward of Fifty (\$50.00) Dollars will be paid any person giving us information which will lead to the Arrest and Conviction of anyone stealing Tools or Material from the Electrical Contractor on this Building.

Electrical Contractors & Dealers Association  
of San Francisco

Phone Garfield 444

522 New Call Building

Cardboard signs like this are posted on all jobs of members of the San Francisco Association of Electrical Contractors and Dealers. It is hoped that this will lessen greatly the loss of tools and material.

## Appliances Demonstrated During Electrical Home Display

Demonstrating the major electrical appliances during the time an electrical home was on display was the unique feature of an electrical exposition managed by B. L. Sawtelle of San Jose, Calif.

Mr. Sawtelle believed in having homes sold by him to be completely wired. He also felt a great deal of sales value of the ordinary electrical home display was lost due to the fact that the appliances were not in actual use.

With this thought in mind he determined to manage an electrical home display and have all of the major appliances demonstrated during the entire period the home was open to the public. Demonstrators were provided for the range, dish washer, refrigerator, clothes washer and ironer. During the thirty days the house was on display over 18,000 people went through it.

The home was located on The Alameda, the main thoroughfare leading out of the city to the main highway. In order to augment the newspaper advertising and other publicity, a

sign 15 ft. high and 30 ft. long was erected on the lot adjoining the home. This called attention to the home and some of the equipment in it. At night this sign as well as the home was floodlighted.

The demonstration method of displaying the electrical home was a complete success and caused a great deal of favorable comment. Mr. Sawtelle believes it to be the most modern way to conduct an electrical home exhibit. Others who contemplate displaying electrical homes well might follow the method used by Mr. Sawtelle.

**THE ELECTRICAL HOME**

EQUIPPED WITH

- The Electric Frigidaire
- The Hot Point Super Automatic Range
- The Fassio Electric Dish Washer
- The Royal Electric Clothes Washer
- The New Thor Electric Ironer

WESIX ELECTRIC HEATERS  
IN THIS HOME INSTALLED BY  
**ROY M. BUTCHER**  
ELECTRICIAN  
SAN JOSE

COMPLETELY FURNISHED BY  
**L. LION SONS & CO.**  
SAN JOSE

COOK LUMBER CO.  
DESIGNERS - BUILDERS

**B. L. SAWTELLE**  
SALES AGENT

OPEN FOR INSPECTION  
FROM 2 PM TO 10 PM

**MAJOR appliances in this electric home were demonstrated during the entire time the home was on display. (A) Exterior. (B) Living room. (C) The electric refrigerator in the kitchen. The refrigerating equipment was located in the basement. (D) The kitchen showing the range, vacuum cleaner, ironer and dish-washer. (E) This 15x30-ft. sign was erected on the lot adjoining the home to augment newspaper and other publicity. At night this sign as well as the home was floodlighted.**

# NEWS OF THE INDUSTRY

## California C. R. E. A. to Continue Work Is Decision of Santa Ana Meeting

Work of the California Committee on the Relation of Electricity to Agriculture will be carried on for another year as the result of a decision reached at a meeting of leaders in agriculture and the electrical industry at which the activities of the committee since its inception in 1924 were reviewed and its plans for the future outlined. The meeting was held at Santa Ana, Calif., June 7, 1926, and was attended by 100 of the principal men of the two industries interested. J. J. Deuel, manager of the law and utilities department of the California Farm Bureau Federation, presided.

Among the speakers were Roy Bishop, president, Orange County Farm Bureau; Prof. B. D. Moses, executive secretary of the committee; Prof. L. J. Fletcher, University of California College of Agriculture and chairman of the committee; W. S. Rosecrans, vice-president, California Farm Bureau Federation; A. Emory Wishon, vice-president and general manager, San Joaquin Light & Power Corporation; R. H. Ballard, vice-president and general manager, Southern California Edison Company; Ezra W. Decoto, member California Railroad Commission, and S. S. Knight, legislative representative of the Grange and Farmers' Union.

It was pointed out by Mr. Bishop that the Farm Bureaus of the state were vitally interested in the work of the committee and that its work so far had brought about a better understanding and greater co-operation between the farmers and the electrical industry. Professor Moses emphasized the fact that the purpose of the committee has been and will continue to be the study of economic uses of electricity on the farms of California, both to show other states the strides which have been made and to develop new applications.

With fourteen important studies either completed or under way the committee already has justified its organization, according to Professor Fletcher. He indicated what might be expected in the way of results from the survey which is being made of the 47,000 agricultural consumers on the lines of California power companies when he stated that a check of 9,000 of the questionnaires which have been returned showed 7,936 irrigation motors on those farms with a total installed capacity of 143,551 hp. He stated further that one-half of all power used on the farms of that state is electrical. The results of the questionnaires sent out will be checked during the summer by field investigations of typical sections and then will be published. Among the important

studies which have been completed Professor Fletcher cited the following:

1. A series of poultry tests using electric heat for brooding chicks.
2. A series of tests on electric milking machines.
3. A series of tests on electric dairy sterilizers. More than 100 such sterilizers averaging 5 kw. each have been installed during the past year.
4. A sales agreement for irrigation and drainage pumps has been drawn up and approved.
5. A study of the dehydration of fruits and nuts. Tests show that the cost of drying walnuts in a 12-kw. plant is comparable with that for other fuels.
6. Tests have been conducted on the use of electric drive in stationary orchard spray plants.

The committee has published 40 articles on various phases of its work, members have given 30 talks, and the University of California has four bulletins in the process of publication on some of its studies.

R. H. Ballard declared that the movement was full of promise both for the electrical industry and the farmers. He pointed out to the farmers that the extension of municipal or state ownership of public utilities will increase the tax burden now borne by agriculture.

Mr. Wishon stated that both the electrical industry and the farmers are interested in the extension of advantageous and economic uses of electricity to the farm. He appealed for the farmers to consider agriculture as a business and urged them to bring their business problems to the attention of business men for assistance in their solution.

That the utility commissions must have the confidence of both the public and the public utilities if they are to discharge their obligations properly was the statement of Mr. Decoto. He showed that in California the electric utilities have been spending an average of \$50,000,000 each year for improvements for the past five years and that the budget for 1926 was \$88,000,000.

The various problems of the farmer and their solution were discussed by Mr. Knight. He pointed out that 30 per cent of the primary power on the farms of the country can be replaced with electric motors. The national average at the present time is 5 per cent and in California the average is 25 per cent. He declared that 65 per cent of the farms in California have electric service.

## Steam-Plant Equipment Ordered by Los Angeles Bureau

The Bureau of Power and Light of Los Angeles recently launched its program of stand-by steam generating plant construction when the Board of Water and Power Commissioners awarded bids for the purchase of three high-pressure boilers and one steam turbo-generator.

In awarding the contracts the board accepted the Chas. C. Moore & Company bid of \$316,816 for three high-pressure boilers and the bid of \$435,300 from the General Electric Company for a 33,000-hp. turbo-generator. The boilers and the steam turbo-generator, it was explained, will comprise the first unit of the stand-by steam plant to be erected by the power bureau in the harbor district. This plant, with its first unit installed, will have a generating capacity of 33,000 hp.

At the present time, the Southern California Edison Company has a petition pending in the supreme court asking that the Bureau of Power and Light be restrained from constructing this steam plant on the ground that it would constitute a breach of the contract between the city of Los Angeles and that company. (Journal of Electricity, March 15, 1926, p. 234.)

## Governor Hunt of Arizona Says He Will Not Run This Fall

George W. P. Hunt, who has served five terms as governor of Arizona, has announced that he will not be a candidate for the Democratic nomination for that office at the fall primary.

Governor Hunt has made a determined fight against the Swing-Johnson Bill, which provides for the building of a dam on the Colorado River at Boulder Canyon by the government, and among the reasons he gives for his decision not to run for office are that he is "the object of assault by a combination of certain industrial and political interests in Arizona" and that he "would have the opposition of powerful money interests of California." The announcement has caused great surprise in political circles as it was understood that Governor Hunt was determined to make the race as champion of what he considered Arizona's inalienable rights on the Colorado River.

**Association Formed to Study Wynooche Power Project Problems.**—An organization to be known as the Home Owners Association of Aberdeen, Wash., has been formed by a group of property owners, headed by Judge W. H. Tucker, to study the problem of the proposed Wynooche power project. It is proposed to investigate particularly the probable cost of the proposed project and its cost to the individual home owner in the matter of taxes.



## **Advises Delay in San Gabriel River Flood Control Plan**

Among the numerous conclusions reached by F. E. Bonner, district engineer of the Forest Service at San Francisco, in his report to Washington on the San Gabriel River flood-control situation, most of which dealt with site choice, co-ordination of interests involved, foundation surveys, water supply rights and other considerations, the following in respect to power rights is given:

"The existing Azusa power development of the Southern California Edison Company, operating under permit issued pursuant to the Act of 1901, would be interfered with by the construction of either the Pine Canyon No. 2 reservoir or the Granite Dike reservoir. Conflict in the former case would not be serious and could be adjusted at reasonable expense. In the case of the Granite Dike, however, it would probably be best to substitute a new plant at the base of the dam. The larger output of such plant would apparently justify the cost of the new installation, as well as redeem the present value of the abandoned plant."

Mr. Bonner's recommendations are that all pending applications be suspended until the state department of engineering completes its survey and study, and that the numerous contending factions be harmonized in a co-ordinate plan approved by the state before receiving rights from the federal government.

F. J. Safely, an inspector on the staff of the Department of the Interior, and H. D. McGlashan, district engineer, United States Geological Survey, joined in making a majority report in which they recommended that the flood control district be granted immediately its application for a reservoir right-of-way as well as for a railroad right-of-way, stating that the application of the City of Pasadena should be held in abeyance until such time as the city shall file with the General Land Office evidence that it has established legal right to impound and divert the waters of the San Gabriel River and has available sufficient funds to construct the project. The report further states that the choice of the site for the dam should be left to the flood control district.

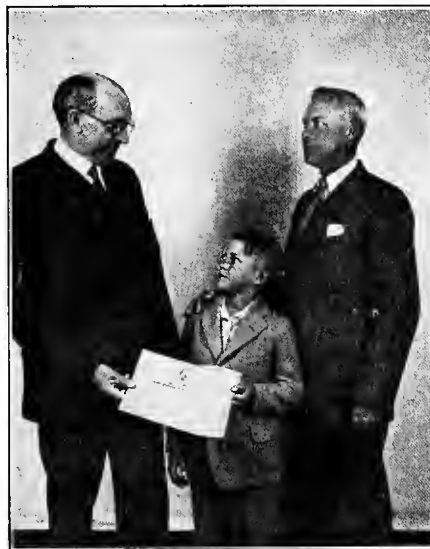
## **Edison Stockholders Reach the 100,000 Quota in June**

Over one hundred thousand stockholders had been secured by the Southern California Edison Company at the opening of business June 19. This is claimed to give the company the largest number of stockholders of any single electric light and power company in the world. Ivan McWhinney, a lad of eight years, residing at 36 Eighth Street, Hermosa Beach, Calif., became the one hundred thousandth stockholder. W. L. Frost, general commercial manager, made the sale to the one hundred thousandth Edison partner. Mr. Frost conducted young McWhinney to the office of R. H. Ballard, executive vice-president and general manager of the company, who handed the lad his stock certificate and congratulated him upon becoming a member of the great Edison family.

The quota of approximately 5,200 stockholders necessary to score the

one-hundred-thousandth mark was completed the week preceding by members of the Edison company organization during what they designated "R. H. Ballard One Hundred Thousand Stockholder Week" in compliment to that official, who had placed July, 1926, as about the time the one hundred thousand shareholders would be obtained.

The Southern California Edison Company now has two and one-half times more stockholders than the average of the electric public-utility corporations in the United States in proportion to the population served, based on the last reports of the National Electric Light Association. The company now has one stockholder to every five families in the community of two and



Ivan McWhinney (center) receiving his stock certificate from R. H. Ballard, executive vice-president and general manager, Southern California Edison Company, as the one hundred thousandth stockholder of the company. W. L. Frost (right), general commercial manager, president of the "Hundred Thousand Club," sold the stock to the boy and presented him to Mr. Ballard.

a quarter million people served. Of its stockholders ninety per cent reside within its service territory and are consumers of its electric product. Compared with national organizations whose stock is widely distributed, the Southern California Edison Company is said to rank now in number of stockholders with the United States Steel Corporation and the Pennsylvania Railroad Company, and as compared to all corporations in the country it probably now ranks fifth in total number of stockholders.

When John B. Miller, president, put the consumer-ownership plan of the company in effect in July, 1917, his company had only 2,000 stockholders, most of whom resided in the East. The increase of 98,000 stockholders during the interval has been largely confined to members of families who use the company's service for light, heat, agriculture, and domestic purposes, and to employees of the large number of factories that have located in the vicinity of Los Angeles within the past few years. The par value of preferred and common stock owned by the company's one hundred thousand stockholders exceeds \$105,000,000, or an average of but approximately \$1,000 to each stockholder.

## **Decision Shows Opposition to Low Head, Large Flow Plants**

Opposition to the development of low-head, large-flow power projects on the lower reaches of California rivers was announced in the decision of the California division of water rights granting to the East Bay Municipal Utilities district a permit to divert 375 sec.-ft. of water from its Lancha Plana reservoir in the Mokelumne watershed for power purposes.

"The division views with some concern," states the opinion given by Edward Hyatt, Jr., president of the commission, "the development of low-head, large-flow power projects on the lower reaches of large streams. If allowed to proceed unrestricted, such plants will establish rights to stream flow which grossly hamper the fullest economic development of the streams. Little, if any, feasible storage is available below such plants, and the result is that releases during the winter season escape to the sea unused.

"We feel it but reasonable, therefore, that future development on the Mokelumne River shall be protected by a clause in the permit which provides no right to the use of water shall be acquired under this application which may, in any way, interfere with future appropriations for agricultural or municipal purposes."

The power to be developed under the permit is estimated at 13,849 theoretical horsepower. Its use is restricted by the permit of the state division to "necessary pumping for the East Bay Municipal Utilities district for the inhabitants thereof."

The permit is in addition to that granted by the division of water rights April 17, giving the utilities district the right to storage of 217,000 acre-ft. of water per annum in the Lancha Plana reservoir and the appropriation of 310 sec.-ft. for municipal uses in the several cities on the east shore of San Francisco Bay.

The district has been granted a license for its Lancha Plana project by the Federal Power Commission, the project to consist principally of the Lancha Plana dam and reservoir. Officials of the East Bay Municipal Utility District have instructed the contractors to start work on the dam immediately.

The Federal Power Commission rejected the conflicting application of Stephen E. Kieffer.

The commission also authorized a preliminary permit for J. W. Preston, Jr., of San Francisco, covering a power project on the South and Middle Forks of the Mokelumne River and the North Fork of the Calaveras River and their tributaries in Calaveras County, Calif. The primary power available at that point is 11,300 hp. Alternate plans of development are proposed, the most feasible one to be decided upon later.

**Puget Sound Company Builds New 33-kv. Line.**—The Puget Sound Power & Light Company through its branch at Ellensburg, Wash., is constructing a 33,000-volt power line to parallel the new High Line irrigation canal down the west bank of the Yakima River, to serve the ranches that will be irrigated by water from the canal. The line will connect with a new substation to be built in Ellensburg.

## Washington Water Power Chelan Power Project Started

Progress on the construction of a two-mile tunnel at the Chelan power project of the Chelan Electric Company in central Washington rapidly is reaching major proportions, with about 300 men now employed there where first attention has been given to the tunnel, before the dam and power station division of the work are undertaken.

Four intermediate and temporary entrances are being constructed to the line of the main tunnel. These consist of two adits and two shafts, making it possible for underground work to be undertaken at eight parts of the main tunnel in addition to the upper and lower entrances. While the plans call for two 14-ft. tunnels, but one of these bores will be completed at the outset. The workmen have encountered granite at almost all points and this tunnel will be lined with reenforced concrete.

Actual construction work on the dam and the power stations will be under way shortly, and these two construction features will be completed and ready by the time the tunnel work is finished. (Journal of Electricity, April 15, 1926, p. 311.)

The dam will be located just below the town of Chelan, which is located at the head of the Chelan River. The tunnel will pierce the south slope of the Chelan River and bring the water to the power station located near where the Chelan River flows into the Columbia. Of the 132,000 hp. total installed generating capacity, about 34,000 hp. will be developed at this time.

## Terms of J. H. McGraw Award Announced for 1926

The committee administering the James H. McGraw Award for electrical men, endowed by Mr. McGraw "to encourage constructive thinking for the advancement of the electrical industry," has announced the terms of the awards for 1926. These are in effect the same as for last year, the details of which were published in full in the Journal of Electricity June 1, 1925, p. 538.

The committee of awards will welcome suggestions from any source that will assist in guiding the judges to the work of men whose services to the electrical industry should have consideration under these awards. Individuals are invited to submit to the committee frank statements of contributions they themselves have made to industry advancement, and to suggest services rendered by others in the spirit of these awards. Employers are urged to recommend the work of members of their organizations. Officials of electrical associations and leagues are asked to see that the achievements of their members and staff employees are not overlooked. All such communications will be received in strict confidence.

Suggestions in reference to the contractor-dealer award should be sent in by Aug. 1, as this presentation will be made at the Electragists annual convention at Cedar Point, Ohio, in August. The other award will close on Sept. 15.

Any man of the electrical industry who feels in doubt as to whether a

certain idea or service rendered in the interest of either the manufacturing, jobbing or contractor-dealer branch of the electrical industry or to promote co-operation between industry groups is applicable or eligible for entry for the award is invited to make inquiry. All communications should be sent directly to The James H. McGraw Award, in care of The Society for Electrical Development, 522 Fifth Avenue, New York City, where information and advice will be gladly given.

## Insull Medal Awarded Midland Counties Employee

Charles R. Laverty, substation helper in the Santa Maria district of the Midland Counties Public Service Corporation, San Luis Obispo, Calif., was awarded the Insull medal for resuscitation at the Pacific Coast Electrical Association convention in Los Angeles. The award was made for his resuscitation of Ben Weiser, lineman, at San Luis Obispo, on March 6, when Mr. Weiser received an electric shock resulting in suspended respiration.



CHARLES R. LAVERTY

The two men were patrolling a 10,000-volt line near the Atascadero substation, looking for line trouble. They found a wire lying on the ground, with the surface of the ground near it baked into a fused crust. Mr. Weiser attempted to turn over a piece of the fused crust near the wire and was shocked and burned by the leaking current. He fell on his back.

Mr. Laverty pulled him away and, finding him unconscious and his breathing stopped, applied the prone-pressure method of resuscitation he had learned at first-aid meetings. After about twelve minutes Mr. Laverty was successful in restoring Mr. Weiser's breathing. Mr. Weiser was removed to San Luis Obispo where he was treated for burns on his hands, tongue and feet.

The medal was awarded to Mr. Laverty by J. M. Buswell, chairman of the accident prevention committee of the Technical Section, P.C.E.A., acting as representative for Mr. Insull.

**Power Company Seeks Right to Make Service Charge for Summer Homes.**—A servicing charge of \$5 for lights used in suburban homes in the Puget Sound district has been requested of the state board of public works by the Puget Sound Power & Light Company, Seattle. The charge will affect summer homes at lakes used only during part of the year.

## Experimental Arch Dam Erected to 60-ft. Elevation

The experimental dam being built by the Engineering Foundation's committee on arch-dam investigation on Stevenson Creek, Calif., (Journal of Electricity, March 1, 1926, p. 197) has been completed to the initial test elevation of 60 ft. The dam will be ready for testing after the curing period has ended.

However, no tests can be made until additional contribution of funds has been made. The total cost of erecting and testing the dam was estimated at \$110,000; of this amount \$84,000 has been contributed, and all of it expended. In order that the tests may be carried on, the remaining \$26,000 must be furnished. If the necessary funds are forthcoming and the 60-ft. structure survives the repeated tests to be run, then the crest of the dam will be raised to a height of 100 ft. and the tests continued.

Results of the tests will be of inestimable value to all those interested in waterworks or hydroelectric developments, and the committee urges contributions from individuals or organizations to enable the completion of the program.

## National Lamp Works Awards Prizes in Sales Contest

Thirty prizes have been awarded by the National Lamp Works of the General Electric Company, Nela Park, Cleveland, in its New Line Drive Contest. The first prize, a 1926 Ford roadster, was given to the Dawson Hardware Company, Kansas City, Mo.; the second, a new Orthophonic Victrola, went to J. R. Bush, Sackets Harbor, N. Y.; and the third, a set of sterling silver tableware, was awarded to Budd's Electric Store, Adrian, Mich. Single choices were offered to the first three prize-winners; the winners numbering from four to twelve, inclusive, were given the choice of two prizes. Of the contestants who ranked from thirteen to thirty each was given five dollars in cash.

More than 11,000 merchants were registered in the contest, which was national in scope and extended from Feb. 1 to March 31, inclusive. The primary object of the contest was to induce the merchant to acquaint his customers with the new inside frosted Mazda lamps, and for this reason the judges were especially interested in the merchant's ability to sell Mazda lamps. The appearance of the store front and the display of electric lamps in the windows were important as were interior displays. Probably the most significant point of the merchant's activity in the contest was the amount of new business obtained, which was shown in his sales increase. A brief written report was required of each merchant registered in the contest, but in no way was the literary merit of the report considered. All that was necessary was a clear, honest report of merchandising activities during the two months of the contest.

The judges of the contest were: Frank E. Watts, editor of Electrical Goods; O. H. Caldwell, editor of Electrical Merchandising, and J. E. North, president of the Cleveland Electrical League.

## Suit Against Los Angeles Filed by Edison Company

Suit has been filed in the superior court by the Southern California Edison Company against the city of Los Angeles and the Board of Water and Power Commissioners for \$840,154.96, which the company claims is due as balance of a bill for \$3,668,352.61 for electric energy purchased by the board from January, 1925, to May, 1926, inclusive, and for the month of July, 1924. The complaint alleges that the city has paid \$2,818,197.65 and had since rejected the company's bills for the balance declared to be due.

The company's petition asserts that the electricity was delivered to the city under terms of contract agreement and disbursed to the city's consumers through the agency of the power commission and that since payment of the \$2,818,197.65 the city has refused to make further settlement of the company's claims.

The company seeks judgment for \$840,154.96, the balance claimed due, with interest at 7 per cent for the period elapsed since the current was delivered and other relief.

## Celebrate Engineers' Day at Colorado University

Two thousand persons attended the annual Engineers' Day at the University of Colorado, Boulder, May 28. Throughout the day engineers of the school held open house and demonstrated laboratory apparatus. The electrical engineers featured a short wave duplex radio-telephone transmission at 100 meters. An artificial telephone line equivalent to one 200 miles long was shown, and the method of measuring wave forms by means of the oscillograph was displayed.

Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, vice-president of the American Telephone & Telegraph Company, and vice-president of the Western Electric Company, was the speaker of the day, making the trip from New York for that express purpose. Dr. Jewett made two addresses. The first, given at the school, was on the subject, "The Changing Status of the Engineer—How Twentieth Century Conditions Are Altering His Relations to Science and Industry." The second, given at the banquet in the evening, was an informal talk intended primarily for engineering students.

Special illumination of the campus and buildings was arranged by the electrical engineering students for the occasion.

## Seeks to Have Department of Public Works Restrained

Upon application of the Parkland Light & Water Company of Parkland, Pierce County, Wash., alternative writ of review was issued recently by Judge J. M. Wilson of the Thurston County superior court against the department of public works.

The company claims to be a mutual company incorporated in 1914 as a non-profit-making concern, and asserts that the department of public works is claiming jurisdiction over the power company's operations and is seeking to make it a public-service corporation by furnishing light and water service to persons who are not members of the company and to expend money of

the members in so doing. It is asked that the department be restrained permanently from interfering with the company.

The suit arose over action of the department in setting a hearing upon complaints made by persons of the Parkland district that the company was refusing water service to persons who obtained their light service from another concern.

## Advertises Community Served Rather Than Itself

The policy of advertising the community it serves rather than itself directly has earned for the California Oregon Power Company a tribute for its public spirit from one of the leading Pacific Coast publications. Reproducing one of the advertisements of the Copco campaign, Western Advertising made the following editorial

*What MORE could one vacation hold?*

Here, in the Crater Lake Country, you will find your ideal vacation.

Enjoy your summer holiday the way you like it best! Fishing—shooting—motoring in your own car or toasting where you please in motor stages.

*Wonderful roads—plenty of trout!*

New, broad mountain highways sling underfoot—surfaced lanes through parklike forests of stately pine, leading to white riffles and bubble-flecked green pools, to still lakes where trout leap in the evening shadows. Here you can camp in the National Forest—and you'll always find a way-side lodge or an excellent hotel a little farther on.

**Crater Lake**

Highways from Roseburg, Grants Pass, Medford, Ashland and Klamath Falls take you to Crater Lake, at the center of the mid-high vacation land, indelibly blue—unbelievably silent as you view it from a thousand feet above—Crater Lake is one of Nature's most magically beautiful creations.

And while you are here, you may find an opportunity to live in this inviting land and profit with its development. Take a few hours, as you travel, and ask about today's opportunities at the Chambers of Commerce.

**ROSEBURG  
GRANTS PASS  
MEDFORD  
ASHLAND  
KLAMATH FALLS**

**The Crater Lake Country**

Published by The California Oregon Power Company to promote a wider knowledge of the territory it serves.

First of a series of advertisements of a campaign started by the California Oregon Power Company to advertise the community it serves rather than itself, and which drew favorable comment from an advertising journal.

comment on the public spirit of the company:

The California Oregon Power Company has invested over twenty million dollars in hydroelectric generating plants and power distribution systems throughout southern Oregon and northern California. The company occupies a position of strategic advantage on three important rivers in its territory, on all of which large amounts of additional power can be developed. Naturally, the field it wants to see developed first of all is the field of industrial demand at home. Industry follows population; population grows through settlers. The power company hopes to obtain these settlers by awakening local interest to the fact that the communities it serves have an opportunity to advertise collectively by engaging in an advertising campaign to which the power company will give financial support and will profit by the results equally with the other contributors. This is the first advertisement to appear in such a campaign.

**Portland Man Files on Umpqua River.**—An application to appropriate water from the Umpqua River, Oregon, has been filed by T. A. Sweeney, Portland, with Rhea Luper, state engineer, Salem, for the development of 10,000 theoretical horsepower at an estimated cost of \$700,000.

## New Tacoma Rate Schedule Cuts Power Rates One-Fourth

By the passage of a new city light and power rate ordinance, the city council of Tacoma, Wash., effected a saving of \$190,000 per year for residents, merchants and industrial operators in that city. The new rates take effect July 1, and the figure of \$190,000 is estimated by Llewellyn Evans, superintendent of light, on the basis of business done by the department during 1925. The largest part of the saving, \$80,000, will be made by merchants under the new commercial lighting rate.

The cut in industrial power rates averages 28.6 per cent, or more than one-fourth, and the rates are said to be lower than those of any other city in the United States. Not only does the new power rate schedule offer big reductions but it simplifies the rate structure so that the industrialist may better understand just how his bill is computed and the reasons for the several gradations in rate. Heretofore the city had a sliding power rate which was based upon the percentage of full time use of maximum demand which the customer's meter indicated. It was too complex and bore down too heavily upon small plants running short hours.

Practically every power customer will get some very cheap power under the new basis. Most of them will have only two rates on their bill, an initial amount billed at 2 cents per kw-hr. and an excess amount billed at ½ cent per kw-hr. Under the new power rates the amount representing 70 hours use per month of the full power demand of a plant will be charged for at an initial rate of 2 cents instead of 2.4 cents as heretofore. This reduction of a sixth in the rate is increased, however, for large users by the new rate for the excess over 5,000 kw-hr. For this excess over 5,000 kw-hr. in the 70-hour-per-month-use computation the rate drops to 1 cent per kw-hr.

The new rate provides a second schedule to cover the amount of power used in excess of the 70-hour-per-month amount which is said to offer the cheapest power ever offered for general consumption. This excess use will cost only ½ cent per kw-hr. for the first 20,000 kw-hr. and for big users a further reduction to three-tenths cent per kw-hr. will be made. Customers heretofore enjoying a special "off-peak" rate, applied because they drew no load when the heaviest demand was on the city plant, will no longer get this special rate, amounting to a 40-per-cent discount, but the new rates make reductions which more than offset the loss of the discount.

**Work on Grays Harbor Company's Cowlitz River Project to Start at Once.**—Actual work on the hydroelectric development project on the Cowlitz River at Mayfield, Wash., will start in July, W. W. Briggs, vice-president and general manager of the Grays Harbor Railway & Light Company in Aberdeen, Wash., has announced. The diamond drilling has been completed and shows that formations are adequate to support the foundations of the large dam proposed. Mr. Briggs states that the company has expended \$240,000 to obtain right-of-way on a nine-mile stretch along the Cowlitz.

## Employees of Washington Utility Learn Safety Practices

An active program of education in the Schaefer method of prone-pressure resuscitation is being conducted by The Washington Water Power Company at Spokane. Group meetings of employees, to which the public and particularly teachers are invited, are being held in the many districts served by the company, with John B. Fiskien, safety engineer, in charge of the work.

About sixty "key" men of The Washington Water Power Company, the Spokane United Railways and the Spokane Central Heating Company recently attended an eight-hour meeting called by Martin J. Flyzik, supervisor of safety of the state department of labor and industries. The approved methods of safety practices, first aid and the Schaefer method were discussed. Certificates will be given to those who took the one-day course.

The Washington Water Power Company now is planning to have group meetings of its employees to witness a demonstration of first-aid methods. The company physicians and a nurse will conduct these meetings.

## Californian Addresses National Chamber of Commerce

The "Advance of Self-Government in the Hydroelectric Industry and How to Accomplish It," was discussed by John B. Miller, president, Southern California Edison Company, Los Angeles, at the group meeting of the natural resources production department during the annual meeting of the National Chamber of Commerce in Washington, D. C.

So long as private enterprise conducts the industry with the highest efficiency, with resulting low costs to the public, there can be no argument for government ownership and operation. This was the main theme of Mr. Miller's remarks.

Taking up the various phases of the industry, he showed that invention, initiative and energy in developing new projects, and effective organization have characterized the conduct of the hydroelectric power industry under private enterprise. Mr. Miller condemned the principle of government ownership and control not alone because of inefficiency but because of the underlying effects upon our political structure. It is impossible to keep out of partisan politics such an important industry touching so closely the daily lives of great numbers of our citizens, he contended, and the building up of great bureaus with centralized power eventually will undermine our political institutions.

Regulation of hydroelectric projects may be accepted as a sound policy in the general public interest, in Mr. Miller's opinion. The Federal Power Act of 1920, which sets up an agency for developing and administering the nation's water power, recognizes the value of private enterprise. Under this law, which the National Chamber helped to place on the federal statute books, hydroelectric development has grown by leaps and bounds.

The common belief that the hydroelectric company secures water power of great value for nothing is a fallacy, Mr. Miller declared. Before the power can be utilized, he said, large investments are required and, as just shown,

the use of the power is subject to government regulation, which assures the operators no greater returns than are fair to the public.

In advocating measures to assure the fullest exercise of private initiative in the hydroelectric industry, Mr. Miller urged business men in every line to support the present federal laws and to set their faces sternly against intervention of government in any line of industry where it could be conducted successfully by private enterprise. Referring to the number of misguided enthusiasts who advocate government ownership and operation of various hydroelectric projects, he emphasized the fact that usually it would be found that there was a selfish purpose of political advantage in the background.

In closing, Mr. Miller urged that, in the light of facts indicating the failure of government in the realms of business, when the hydroelectric industry or any other industry is subject to attack every business man should "stand up and be counted."

## Equipment for Paper Plant at Port Angeles Purchased

For the Washington Pulp & Paper Company, a Zellerbach Paper Company plant at Port Angeles, the Northwestern Power & Light Company has awarded contracts for equipment to the extent of \$250,000 recently.

To the General Electric Company was awarded contracts for three 45,000-kva. transformers, three 5,000-kva. transformers and switchboard equipment for a substation, a 13,333-kva., 225-r.p.m. vertical water-wheel-type generator, together with switchboard and supervisory control apparatus.

The contracts call for about \$175,000 for apparatus from this company.

The Westinghouse Electric & Manufacturing Company also was awarded contracts on the project for apparatus costing about \$75,000, it is reported.

## Power Plant to Aid in Starting Steel Industry in Chile

As one of the steps in the establishment of the steel industry in Chile, the Compania Electro Siderurgica e Industrial de Valdivia plans to build a hydroelectric power plant of 35,000-hp. capacity in the Valdivia Lake region in the southern part of the country.

The power generated will be used in the reduction of iron ore by processes which have been developed successfully in Sweden and other European countries. The proposed steel plant, which is to have a yearly output of 50,000 tons, will be located at Corral, which is within easy transmission distance of the proposed power site, and the necessary transmission system and substations will be built to deliver the power from the power house. The Engineers Corporation, a subsidiary of the J. G. White Engineering Corporation of New York, has been engaged to carry out the engineering and construction of the proposed development.

The enterprise is one of great national interest and importance, and the government is backing the undertaking to the extent that it has enacted the necessary decrees granting a subsidy and guaranteeing the company's bond issue both as to principal and interest.

## Utility Inaugurates Course for Engineering Graduates

An apprenticeship course for engineering graduates has been inaugurated by the Southern California Edison Company, Los Angeles. This action is in keeping with the company's policy of enlisting the services of young men of ability of the community in which it operates for enrollment in its permanent organization. In this particular instance it desires to continue this policy by securing from each year's graduating class of the nearby universities a few of the most competent young engineers, who eventually may qualify for better positions as they may open.

It is planned to start this course, which is to cover a period of fifteen months, with not more than fifteen men carefully selected from the various California schools. The fifteen months' time of each student will be divided approximately as follows: three months in the engineering department, two months in the construction department, four months in the operating department, and one month each in the test, shop, accounting, commercial, stores and investment departments.

Basic qualifications are as follows: (1) Applicant must have graduated from a recognized college or university with either an A. B. degree or B. S. in civil, electrical or mechanical engineering. (2) Applicant must pass satisfactorily a very thorough physical examination given by the company's own medical department.

Due consideration will be given to the applicant's previous record in athletics and other college activities as an indication of his qualifications for leadership and ability to co-operate with others. No contract for service during the training course will be given or required, but each student must make a declaration of intention to complete the course.

A week of introductory lectures to familiarize the class with the general Edison organization will precede the actual work of the course. During that week the members of the class will be given an opportunity to become acquainted with the company officials and department heads. The beginning date for the course has been set for July 1.

Upon completion of the course, each student whose services have proved satisfactory will be offered a position in some department of the company at a going wage for that position. Each student will be permitted to express his preference as to the department and position desired. The department heads in turn will express to the personnel committee in charge of the final placement of the students their particular preferences as to individuals.

**Sultan Electric Company Bought by Puget Sound Company.**—The Puget Sound Power & Light Company, Seattle, has acquired through purchase the entire transmission, distribution and generating system of the Sultan Electric Company. Under the purchase the Puget Sound company will serve the towns of Sultan, Startup and Gold Bar.



## News Briefs

**Survey of Market for Electrical Appliances in Spokane Country Issued.**—A 40-page survey of the market for electrical appliances in Spokane and the Spokane country, has been issued by the Review-Chronicle National Advertising Bureau, Spokane, Wash. The field covered is of 150-mile radius, comprising 564,000 consumers in 522 cities and towns. The survey goes into great detail, giving much statistical data on the hydroelectric power of the Spokane country, electric coverage, lighting rates, wired homes, domestic light customers, electrical appliance sales and saturation, electric ranges, rural electrification, home-building, buying power, water-power production and potentialities, and potential sales outlets. Many maps, graphs and charts are used, and the sources of information presented include appliance dealers, power and light companies, U. S. Geological Survey, Journal of Electricity, Electrical Merchandising and Electrical World.

**Southern Colorado Power Company Acquires Properties.**—Announcement has been made by H. M. Byllesby & Company that the properties of the Arkansas Valley Electric Company serving the city of Florence, Colo., and the adjoining towns of Rockvale, Coal Creek and Williamsburg have been purchased and will be operated as part of the system of the Southern Colorado Power Company. The properties were purchased from T. B. Stearns and associates of Denver. The Southern Colorado Power Company has been wholesaling electric energy to the Arkansas Valley Electric Company for some years. Florence is located in one of the oldest oil fields in the state. Other industries there include oil refining and lead and zinc smelting. The Fremont County coal fields also are located in the district.

**East Kootenay Company to Build Steam Plant at Fernie, B. C.**—The East Kootenay Power Company, which has two hydroelectric installations on the Elk River, has decided to erect a 5,000-kw. steam plant at Fernie, B. C., which, when completed, will bring the company's total power capacity up to 30,000 hp. The company supplies power to the Consolidated Mining & Smelting Company of Canada's Sullivan and St. Eugene mines, the Crow's Nest Pass Coal Company's collieries, the towns of Fernie and Cranbrook, and several small communities.

**Ornamental Lights for a Large Section of Pasadena, Calif.**—Ornamental lights for a large section of territory on the west side of Arroyo Seco were granted by the board of directors of the city of Pasadena, Calif., when a petition representing a large portion of the frontage on eleven streets was filed. It is proposed to install lights on Avenue Sixty-four, La Loma Road, Avon Avenue, Glen Holly, Juniper Drive, Glen Oak Tamarac Drive, Cherry Drive, Cheviotdale Drive, Capinero Drive and Anita Drive.

**Pole Companies Sued for \$1,205,000.**—Suit claiming damages to the extent of \$1,205,000 and attorneys' fees, etc., has been brought by Stephen W. O'Brien, former pole-company owner, against the National Pole Company, B. J. Carney & Company, Lindsley Brothers Company, and the A. T. Naugle Pole & Tie Company, charging combinations in restraint of trade. The plaintiff claims that the defendants by agreements under the Western Red Cedar Association, Western Red Cedar-men's Information Bureau, and Western Lumber & Pole Company violated the anti-trust act. In a suit, brought last year by the Federal Trade Commission against the same group, charging restraint of trade, the defendants pleaded guilty, and upon this conviction the O'Brien suit is being instituted.



New 15,000-kva. 50/60-cycle G. E. frequency changer under installation at the Vestal substation of the Southern California Edison Company, as it appeared to the Journal photographer May 27. The machine is equipped for closed-system air cooling and carbon-dioxide fire extinguishing. It forms the second tie between the Edison company's San Joaquin Valley and Big Creek systems.

**Electric Homes as Test Houses for Westinghouse Engineers.**—In the new \$175,000 housing development of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, planned for its employees, the homes will have the most complete electrical equipment ever installed as standard design and will include electricity for heating, as well as for cooking and for use with other electrical appliances. Twenty-five of these homes will be ready for occupation before September. These homes will serve as test houses and will be sold to engineers of the company who will conduct experiments to develop data on electric house heating.

**Portland Company Elects Two New Directors.**—At the annual meeting of the stockholders of the Portland Electric Power Company, Portland, held recently, E. B. McNaughton of the Strong & McNaughton Trust Company, Portland, and W. H. Lines, assistant to the president, Portland Electric Power Company, were elected to the board of directors of the company. Mr. McNaughton succeeds W. M. Lead, who had resigned on account of ill health, and Mr. Lines, having previously been appointed by the board to serve the unexpired term of the late F. I. Fuller, was confirmed officially in this appointment.

**Activities in Electrical Industry in Japan.**—Among the activities in electrical development in Japan, as reported lately by Denkinotomo, are the plans of the Kuhara Mining Company, with water rights sufficient to insure the generation of 100,000 kw. in Gifu prefecture, to develop 40,000 kw. through a plant at Iijima. The Shokawa Hydroelectric Company has begun development work on the Shokawa River. The maximum output of the plant, which is expected to be completed by the end of next year, will be 72,000 kw. Evidence of growth is presented in the plans of the department of railways, which operates the rapid transit system in Tokyo, to build five large substations in the suburbs, the largest of 8,000-kw. capacity and the smallest of 6,000 kw.

**Water Diversion and Storage Permits Granted El Dorado Water & Power Company.**—The California Division of Water Rights has granted permission to the El Dorado Water & Power Company to divert 250 sec.-ft. of water from the Silver Fork of the South Fork of the American River and to store 7,500 acre-ft. Plans of the company call for the construction of a reservoir and power plant to cost \$3,659,000 and capable of developing 24,859 hp. Two additional permits allow the El Dorado Water & Power Company and the Western States Gas & Electric Company, of which the former company is a subsidiary, to divert the storage water for use at established plants farther down on the stream and to increase the capacity of those plants.

**Power Company Surveys for High Distribution Line.**—Survey crews of The Washington Water Power Company are now at work on the highest distribution line of that company to be constructed this summer in the Coeur d'Alene mining district of northern Idaho. This line will be operated at 13,000 volts and will serve the Jack Waite mine. About 3½ miles will be built, beginning at an elevation of 4,250 ft., and going up over a ridge which is 5,750 ft. high. The line at one point raises 1,700 ft. within a mile.

**Rates Reduced in Oregon.**—Affecting all the territory served by the Yamhill Electric Company, Newberg, Ore., that comprises many small towns and rural communities in the Tualatin and Yamhill Valleys in the vicinity of Portland, a voluntary reduction in rates recently was put into effect. The new rates provide average reductions in the following schedules: commercial power, 3 per cent; rural power and light, over 3 per cent; city residence light, nearly 12 per cent, and commercial light, over 14 per cent.

**Radio Company Announces Changes in Ownership and Personnel.**—Announcement has been made that the Remler Radio Manufacturing Company has been purchased by the firm of Gray & Danielson, San Francisco. It will be operated as the Remler Division of Gray & Danielson. George Curtiss, formerly sales manager of the Wholesale Electric Company, has been appointed sales manager of the new company. Headquarters will be at 260 First Street, San Francisco.



## News of the Electragists



### Complete Report of San Diego Meeting in July 15 Issue

The quarterly meeting of the California Electragists, Southern Division, which was held in San Diego on June 26 will be reported completely in the July 15 number of the Journal of Electricity.

This meeting was featured with constructive work including the reports of the activities of the motor, estimators' and merchandising sections of the organization. The Red Seal plan and other interesting subjects were discussed by capable speakers. The entertainment features of the convention were well organized and particular attention was paid to the ladies' comfort and enjoyment.

**California Electragists Appoint Accountant to Assist Members.**—Better accounting methods by its members and a careful scrutiny of credits by jobbers have been fostered by the executive committee of the California Electragists, Southern Division. Vernon Hunter of Los Angeles has been appointed the accountant for the organization, and his services are available to the members. Mr. Hunter has made a study of the accounting system of the Association of Electragists, International, as well as other methods adaptable to the electrical contractor-dealer business.

**N. C. Hopkins Company** have moved into larger quarters at 1437 Twenty-third Avenue, Oakland, Calif. A line of hardware has been added to supplement the electrical lines.

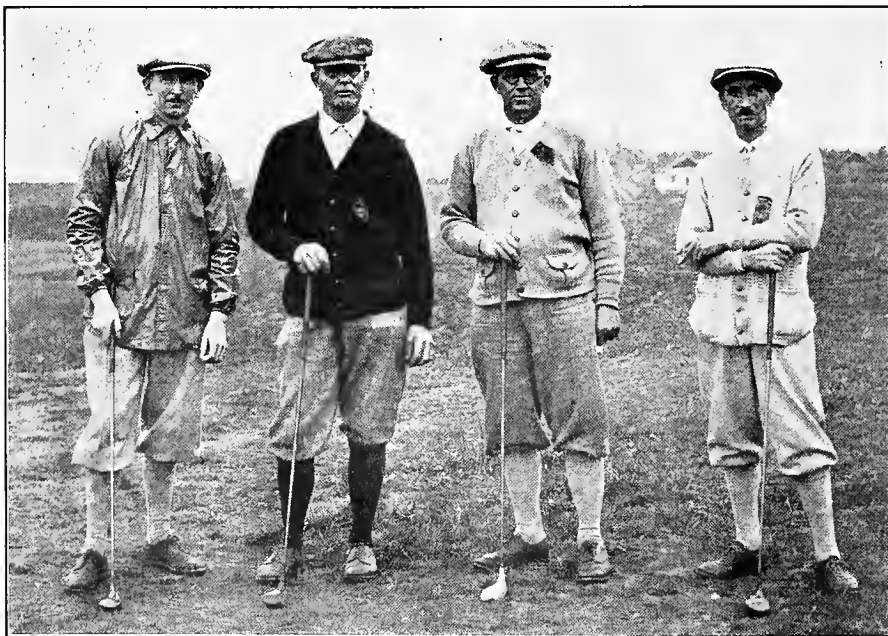
### Electragists Present Papers at P.C.E.A. Convention

California Electragists presented their story to the central-station branch of the industry at the general session of the Pacific Coast Electrical Association convention on June 10 at the Biltmore Hotel in Los Angeles.

Clyde L. Chamblin, of the California Electrical Construction Company, San Francisco, presented a paper prepared by himself and Charles T. Hutchinson on "The Electragists and Their Relation to the Industry as a Whole." Mr. Chamblin was followed by O. N. Robertson of the Robertson Electric Company, Santa Ana, who also is chairman of the merchandising section of the California Electragists, Southern Division. Mr. Robertson's paper, "Electragists' Retail Selling," presented the results that already have been obtained by the merchandising section.

**William H. Beamer** has resigned his position with the J. C. Hobrecht Company, Sacramento, Calif., to enter the electrical contracting business for himself. He has opened an office at 910 Ninth Street that city. Mr. Beamer has become a member of the Electrical Contractors and Dealers Association of Sacramento and the California Electragists.

**Electragists of Glendale Change Name of Organization.**—The Electragists of Glendale, Calif., have changed the name of their association from the Electrical Safety Exchange of Glendale to the California Electragists, Glendale Branch.



Who said a contractor couldn't play golf? J. J. Agutter (right), contractor of Seattle, Wash., won the annual golf tournament of the Electric Club of Seattle which was held recently. In this foursome of real golfers, from left to right we have: Walter Fumfsinn, Seattle Lighting Fixture Company; R. E. Thatcher, Puget Sound Power & Light Company, who was chairman of the tournament; Herb Boring, General Electric Company; and Jack Agutter, winner of cup.

## Book Reviews

### ELEMENTARY ELECTRICAL TECHNOLOGY

By A. M. Parkinson, B. Sc. Eng. (London), A.M.I.E.E., Lecturer in Electrical Engineering at the Battersea Polytechnic. 5 x 7 in. 179 pages. 129 illustrations. Cloth bound. \$2. Oxford University Press, American Branch, New York.

In three main chapters the author outlines the fundamental theories of electric circuits. Two additional chapters are included for reference purposes. In the first chapter is covered the d.c. circuit; power, current, resistance and other calculations and an introduction to combination circuits. Chapter two treats of the magnetic circuit, permanent magnets and electromagnets. The theory of electromagnetic induction also is covered in this chapter. In the third chapter the alternating circuit is discussed. Simple a.c. theory is covered, together with something of an introduction to the less involved a.c. calculations such as resistance, capacity, inductance and combinations of these.

Elementary principles of the oscillatory circuit are introduced in chapter four as somewhat of an explanation of inferences in preceding chapters. This, with chapter five on absolute units and a brief explanation thereof, gives the user of the book a handy reference. A series of appendices also explains certain specific conditions touched upon in the text.

The book would serve well as a text for secondary technical schools or for the further education of practical electricians who desire a general idea of electrical fundamentals.

### TRANSMISSION LINE FORMULAS

By H. B. Dwight, D.S.C., Author "Constant Voltage Transmission." Second edition, revised and enlarged. D. Van Nostrand, New York. 216 pp., 6 x 9 in., cloth, illustrated, price \$3 net.

A concise manual of transmission-line calculation, equally suited to engineer or student, concerned with the problems of line regulation. The formulas are based on the convergent series method of analysis and have been reduced by the use of constants to forms which require no higher mathematics for their application.

Solutions for different sets of assumed conditions are arranged advantageously in tables, entirely separate from the theoretical discussion of formula derivation, and sample calculations amply illustrate their use. The degree of accuracy is stated for each solution. In connection with problems of short line calculation, a graphic chart is included which materially reduces the mathematical work required and is especially serviceable for rapid reference.

The original subject matter of the first edition has been tested thoroughly during the past decade of very active development in this field, and its appearance unchanged in the present volume is convincing proof of its reliability.—R.H.T.

## Meetings

### Clark Baker Addresses Annual Optometric Convention

Representing the electrical industry and its part in conservation of vision and extension of means to provide clear and comfortable light, Clark Baker, National Lamp Works, Oakland, chairman of the San Francisco Bay Cities chapter, Illuminating Engineering Society, and chairman of the lighting committee of the Commercial Section, P.C.E.A., addressed the twenty-ninth annual meeting and educational congress of the American Optometric Association at the Civic Auditorium in San Francisco July 2.

Mr. Baker was requested to make a talk and present a paper for publication with the proceedings of the Optometric Association following his report at the Pacific Coast Electrical Association's convention in Los Angeles. Members of the Optometric Association heard him there and learned of the work of the lighting committee last year.

### Victoria to Be Site of Jobbers' Annual Convention

The Pacific Division of the Electrical Supply Jobbers Association will hold its annual convention Sept. 7-9, in Victoria, B. C., at the Empress Hotel, according to announcement of Albert H. Elliott, secretary.

The rates at the Empress Hotel during the convention will be "special American plan rate of \$8 per day, providing special table d'hôte meals, and with two persons in one room with bath, and \$10 per day for single room with bath."

A notice calling for reservations will be sent out by Mr. Elliot about Aug. 1.

### Manufacturers Stage Festivities at Development League

At the June 21 meeting of the San Francisco Electrical Development League the manufacturers of electrical supplies and their representatives presented members of that organization with items of merchandise valued in aggregate at about \$500. The day was called "Manufacturers' Day" in honor of the occasion.

Each table in the dining hall was numbered. For each table a prize was provided, ranging from a 1-kw. air heater to flashlights, lamps, radio batteries, or appliances such as toasters, percolators, etc. Ben Tassie, chairman of the day, then set a contest for each table, the winner to receive the award for that table. Arthur Rowe and L. F. Leurey were appointed judges. At some tables the contest was determined by the height, some by the girth of the diners, some by the size of collars, shoes, or weight of underwear. Length of name, numbers on auto license card, length of marriage or number of children were determining factors in other instances.

Two general prizes, a percolator and a vacuum cleaner, were awarded to those guessing the number of coffee

beans in the percolator basket and the total membership of the league, respectively. The requirements for prize-winning and the manner of decision of winners, together with remarks from the chairman or members of the league, provided a great deal of amusement.

### COMING EVENTS

Association of Electragists, International—  
Annual Convention—Cedar Point-on-Lake-Erie,  
Sandusky, Ohio  
Headquarters—The Breakers  
Aug. 24-27, 1926

Electrical Supply Jobbers Association, Pacific  
Division—  
Annual Convention  
Empress Hotel, Victoria, B. C.  
Sept. 7-9, 1926

American Institute Electrical Engineers—  
Pacific Coast Convention, Salt Lake City, Utah  
Sept. 7-10, 1926

California Electragists—  
Annual State-wide Meeting—Hotel Del Monte  
Del Monte, Calif.  
Oct. 1-3, 1926

### Agutter Wins Martin Trophy in Seattle Club Tourney

The annual golf tournament of the Electric Club of Seattle for the Henry J. Martin trophy was held at the Olympic Golf and Country Club. Preceding the play the regular club luncheon was served at the club house.

Play was medal score with handicap allowance. In addition to the Harry J. Martin trophy for the low medalist, a Gosum driver was offered for second prize and a Kroflite iron for third prize, these being open to competition by members only. Special prizes were offered as follows: one dozen golf balls for the low medalist among the guests and one-half dozen golf balls for the second prize. Open to all: one-half dozen balls for the longest drive from the thirteenth tee; one-half dozen balls for the nearest approach to the pin from the tee on the short seventh hole; and one-half dozen balls for the greatest number of holes requiring but one putt.

J. J. Agutter and C. O. Schmutz tied for first honors in the members' competition with 93-22-71, and Harry J. Martin won third with 99-24-75. In the play off held over the same course four days later, J. J. Agutter

won first with 93-22-71, Mr. Schmutz taking 104-22-82. First favors among the guests were won by C. F. Carskadden with 83-10-73 and second by E. L. Crider, 88-11-77. The longest drive, 260 yd., and the greatest number of holes in one putt, six, were won by C. F. Carskadden. The nearest approach to the seventh pin was won by A. W. Leonard, 10 ft. In addition to the individual play, there was a team match between the Kilowatts, captained by J. J. Agutter, and the K.V.A.'s, captained by H. A. Boring. This was won by the Kilowatts, the losers thereby furnishing the lunch to the winners.

### Program Committees Announced by San Diego Club

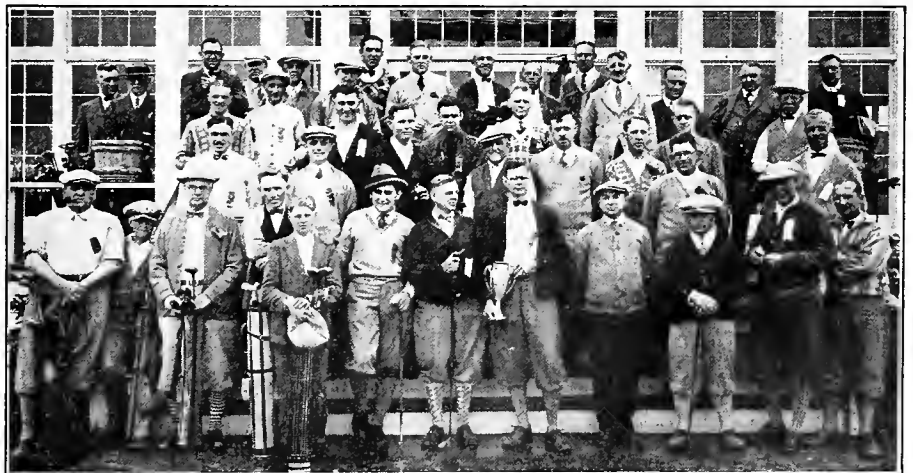
With each committee responsible for a program, the San Diego Electric Club has established a schedule of meetings for the entire year in its selection of committees for the year. A number of special meetings, interspersed between programs for which committees are responsible, guarantee entertainment for the season.

The committees announced for 1926 activities are:

Program and publicity—F. M. Raymond, chairman; Henry B. May. Membership—Ralph Chase, chairman; P. P. Pine. Intercity relations—Fred G. Goss, chairman; Ralph Zink, Walter C. Wurfel, C. H. Paulin. Back country electrical relations—Edwin W. Meise, chairman; Al May, E. W. Weathers, E. W. Kimmore.

Power company co-operation—Ray C. Cavell, chairman; R. B. Ayres, Guy H. Miller, Roger Ruffin, R. H. Taber. Electrical contractors—W. M. Boyce, chairman; Bruno Barth, W. W. Gibson. Electrical dealers—G. R. Walters, chairman; Earl C. Myers, Frank Burton, C. H. Messner. Electrical wholesalers—R. A. Pearson, chairman; J. Frank Munro, Sam L. Hall, E. M. Ellis. Manufacturers—Milton Henoch, chairman; Henry B. May, P. P. Pine. Sports and outing (Picnic)—C. D. Weiss, chairman; Walter S. Rainey, Chris Goldkamp, C. F. Creelman. Army and Navy relations—Gilbert W. Cattell, chairman; Com. deWitt C. Webb, Fred W. Simpson.

Street railway co-operation—Claus Spreckels, chairman; W. F. Raber, C. A. Stevens. Interclub relations—Carl H. Heilbron, chairman; H. R. Peckham, Walter C. Wurfel, Dan J. Kelly. Engineering and technical—L. M. Klauber, chairman; H. H. Watson, Hartwick M. Barnes, A. S. Glasgow. City government relations—A. E. Johnstone, chairman; Frank O. Carlson, C. H. Smith, Bruno Barth. Public relations—Percy Adams, chairman; C. A. Stevens, F. M. Raymond, W. F. Raber, Al May. Street lighting—G. H. P. Dellman, chairman; Durlin Flagg, I. N. Lawson, Jr. Better wiring—W. W. Gibson, chairman; A. E. Johnstone, T. D. Krames, W. H. Talbott. Telephone company co-operation—C. A. Stevens, chairman; Herbert Rose, C. L. Lawrie.



Despite rain a large entry list turned out for the annual golf tournament of the Seattle Electric Club, playing for the Harry J. Martin trophy. T. S. Wood, president of the club, is seen (center) holding the cup, which he lost to J. J. Agutter.



## Personals

S. Waldo Coleman, president-elect of the Pacific Coast Electrical Association, was born in Grass Valley, Calif., Sept. 7, 1881. His early education was received there until the family moved to San Francisco in 1892. He attended the University of California and was graduated with the class of 1903. He then went to Schenectady and worked in the shops of the General Electric company for two years. Following that he worked for the Petaluma & Santa Rosa Railroad Company



S. WALDO COLEMAN

at Petaluma as master mechanic. In 1906 he went to Santa Cruz as manager of the Union Traction Company under John Martin, who was then president. Two years later Mr. Coleman was made manager of the Coast Counties Gas & Electric Company and in 1913 became president of the company, taking charge of the affairs of that organization in its San Francisco office. He always has felt keenly the advisability of customer-ownership, and the Coast Counties Gas & Electric Company was one of the early companies to inaugurate that policy. Mr. Coleman's interest in the electrical industry has been reflected in his activity in the Pacific Coast Electrical Association in which, in addition to serving as first vice-president for 1925-1926, he has been a member of the public policy committee, a member of the executive committee, and a member of the executive committee of the Public Relations Section. In addition to his electrical duties, Mr. Coleman finds time to be a director of the Bank of California, of the Midway Gas Company, of the West Coast Life Insurance Company, and president of the Russ Building Company, which is erecting a 30-story building in San Francisco. He is a member of the American Institute of Electrical Engineers and belongs to the Pacific Union, University and Burlingame Country Clubs.

Dr. Frank B. Jewett, president, Bell Telephone Laboratories, vice-president, American Telephone & Telegraph Company, and vice-president, Western Electric Company, New York City, was the principal speaker at the recent celebration of Engineers' Day at the University of Colorado, Boulder.

Walter Houseworth, for the past four years district superintendent in the Covina district of the Southern California Edison Company, has been transferred to the San Bernardino district in the same capacity. Charles Harkelrath, who has been district superintendent in San Bernardino for a great many years, shortly will retire, having completed twenty-five years of service with the Edison company. J. B. McClure, district superintendent Visalia district, has been transferred to Covina. James A. Anderson, district superintendent of Hanford, will replace Mr. McClure, while Glenn Luther, assistant district superintendent from the Compton district, goes to Hanford as district superintendent.

K. E. Van Kuran, who recently resigned as manager of the Los Angeles branch of the Westinghouse Electric & Manufacturing Company, has been made an honorary life member of the Electric Club of that city.

W. F. Raber, vice-president and general manager, San Diego Consolidated Gas & Electric Company, was in San Francisco recently attending a hearing on the application of that company for the issuance of new bonds.

Arnold Pfau, Jr., American Resistor Corporation, San Francisco, recently spent a week in Fresno, Calif.

J. A. Tobyn, operating engineer, and Don Campbell, engineer in the light and power department, respectively, The Washington Water Power Company, acted as guides when about 200 high school students recently visited the company's Spokane stations.

Harry Woodward, sales manager, Great Western Power Company, San Francisco, and J. W. Wrenn, assistant sales manager, motored down to Los Angeles to attend the P.C.E.A. convention.

W. D. Shannon, general superintendent, division of construction and engineering, Puget Sound Power & Light Company, Seattle, delivered an illustrated address on "The Baker River Hydroelectric Development" at a recent meeting of the Seattle Electric Club.

W. K. Vanderpoel, vice-president and executive engineer, The Okonite Company and the Okonite-Callender Cable Company, Passaic, N. J., was among the Eastern visitors who attended the convention of the Pacific Coast Electrical Association in Los Angeles.

E. E. Valk, district engineer, and J. O. Dillingham, merchandising department, General Electric Company, Los Angeles branch, were recent visitors in San Diego.

George Armstrong, representing the Garland-Affolter Engineering Company, was in San Diego for a brief stay not long ago.

R. U. Muffley, eastern district manager, A. M. Chitty, southern district manager, Puget Sound Power & Light Company, Seattle, and Dwight Ware, manager of its Securities Company, were among those who attended the recent conference of Stone & Webster managers at Norfolk, Va.

W. F. Nordholt, who has been district manager of the Venice district of the Southern California Edison Company, has been transferred to the Santa Monica district as assistant district manager following the merging of the Venice and the Santa Monica districts. C. E. Hewes will continue as district manager of Santa Monica.

M. W. Scanlon, formerly advertising and publicity director, Westinghouse Electric & Manufacturing Company, San Francisco, has joined the staff of the Pacific Railways Advertising Company.

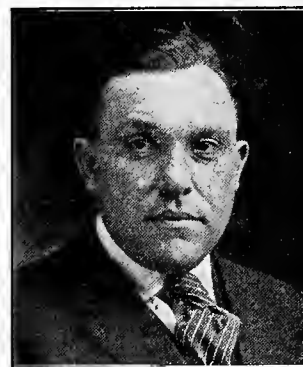
J. B. Black, vice-president and general manager, Great Western Power Company, San Francisco, has returned from Atlantic City where he attended the N.E.L.A. convention.

A. Griswold, of the A. G. Manufacturing Company, Seattle, not long ago departed on a trip to Montreal, New York and other Eastern cities. He was accompanied by Mrs. Griswold.

E. F. Perkins, sales engineer, Pacific Gas and Electric Company, San Francisco, recently made a tour of the company's district offices in the Sacramento Valley.

J. D. Ross, superintendent of lighting for the City of Seattle, recently returned from an extensive trip through a number of Eastern cities made for the purpose of studying electrical devices for proposed use in enlarging the city's distribution system.

A. E. Hitchner, since 1919 assistant to the manager of the industrial department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, has been appointed manager of that company's Los Angeles office, succeeding K. E. Van Kuran, resigned. Mr. Hitchner is a native of New Jersey and spent his early years on the Atlantic Coast. After obtaining his degree in electrical engineering from Rutgers College in 1904, he entered the apprentice course for college graduates at the Baldwin Locomotive Works in Philadelphia, remaining there two years. He left there to join the Link Belt Company, also located in Philadelphia, and for two years was active in construction work of that company. His next work was operating the Kaolin mine located in Florida. After a year of mining operations he joined the Westinghouse company in 1909 and was assigned to general industrial sales work in the Philadelphia office. Three years later he was placed in charge of anthracite mining sales projects of the company, this work carrying him to the north-



A. E. HITCHNER

western section of Pennsylvania. Later he established the Wilkesbarre, Pa., sub-office of the company. In 1919 he was transferred to East Pittsburgh as assistant to the manager of the industrial department, his work having to do specifically with mining and oil industries.



**J. M. Buswell**, general inspector, San Joaquin Light & Power Corporation, Fresno, Calif., and for the past two years chairman accident prevention committee, P.C.E.A., has been elected a national director of the American Association of Engineers for the territory including California, Nevada and Hawaii. Mr. Buswell recently left to attend an executive board meeting of the A.A.E. in Washington, D. C., and will return by way of Canada.

**B. A. Graham**, formerly Western representative for the Chicago Flexible Shaft Company with offices in San Francisco, has been appointed sales director of the appliance department of that company with headquarters in Chicago.

**H. E. Sandoval**, Sandoval Sales Company, San Francisco, visited Sacramento a short while ago.

**George Rucker**, Pacific Coast manager, The Holophane Company, with headquarters in San Francisco, lately made a trip to the factory at Newark, Ohio, to attend a sales conference.

**H. H. Singletary**, formerly connected with the electric truck division, Pacific Gas and Electric Company, San Francisco, has been transferred to the San Jose division where he will be engaged in selling industrial heating and commercial cooking equipment.

**Harry Turner**, electrical jobber of Butte, Mont., was among those who attended the recent meeting of the Pacific Coast Electrical Supply Jobbers Association at Del Monte, Calif.

**J. R. Wells**, Fobes Supply Company, and **W. M. Meacham**, of Meacham & Babcock, have been elected to the board of directors of the Seattle Electric Club to fill the unexpired terms of **D. M. Roderick** and **R. M. Cole**, resigned.

**Ray C. Cavell**, superintendent of the record department, San Diego Consolidated Gas & Electric Company, is president of the San Diego Electric Club. He recently succeeded **C. C. Clardy** who, due to pressure of personal business, found it necessary to give up the post. Mr. Cavell has been identified with the Electric Club for many years and has taken a prominent



RAY C. CAVELL

part in its activities. This is the second time he has served as president of the organization. He has been connected with the San Diego Consolidated Gas & Electric Company for the past fifteen years, having entered its employ in 1911. Mr. Cavell is a native of Cleveland, Ohio.

**George Bakewell, Jr.**, of Denver, for two years field representative of the Electrical League of Colorado, has been appointed representative of that organization handling the duties of the late **S. W. Bishop**. Mr. Bakewell, upon being discharged from the army, entered the employ of the Emerson Electric Company, St. Louis. Shortly thereafter he moved to Denver and entered the newspaper field. In 1922 he became associated with one of the local advertising agencies and continued in that activity until his appointment in August, 1924, as league field representative.

**A. E. Holloway**, superintendent commercial department, San Diego Consolidated Gas & Electric Company, a short while ago attended a state meeting of the advisory councils, California Development Association, in San Francisco.

**H. M. Crawford**, general sales manager, Pacific Gas and Electric Company, San Francisco, has returned to that city after attending the N.E.L.A. convention at Atlantic City.

**Rushby C. Midgley** has been appointed district manager of the branch office newly opened in Salt Lake City by **Warren Webster & Company**, Camden, N. J.

**B. M. Tassie**, Pacific Coast district manager, Manning, Bowman & Company, Meriden, Conn., whose headquarters are in San Francisco, was among the electrical men of that city who attended the P.C.E.A. convention.

**Charles Northcutt**, manager of the Pacific Gas and Electric Company's office at Modesto, Calif., was among those present at the P.C.E.A. convention.

**Claude W. Mitchell**, electrical engineer, Board of Fire Underwriters of the Pacific, San Francisco; **H. N. Beecher**, chief electrical inspector, City of Los Angeles, and **R. J. Larrabee**, engineer, Underwriters' Laboratories, Inc., San Francisco, attended a recent meeting of the Underwriters' Laboratories' Electrical Council in Chicago.

**Miss Cristel Hastings**, assistant to **Samuel H. Taylor**, secretary of the Pacific Coast Electrical Association, transferred her activities to Los Angeles to assist Mr. Taylor with his numerous duties during the P.C.E.A. convention.

**Roy H. Felt**, of Salt Lake City, representing the Chapin Cedar Company of Spokane, was among those in attendance at the P.C.E.A. convention.

**H. M. Thomas**, representing **Schweitzer & Conrad**, Chicago, with headquarters in San Francisco, attended the P.C.E.A. convention in Los Angeles.

**A. A. Smith**, attorney, Eastern Oregon Light & Power Company, Baker, Ore., addressed the Oregon Bankers' Association in convention at Gearhart, Ore., on the bankers' relationship to public utilities. Following the address the association went on record as opposing the proposed bills to permit the state to enter into the power business.

**Roy J. Heffner**, secretary of the general committee on employment and training, Pacific Telephone & Telegraph Company, San Francisco, a short while ago attended a Bell System educational conference held in New York, to which eighty leading deans and professors of colleges of business administration, commerce and economics were invited.

## Obituary

**H. W. L. Gardiner**, business manager of McGraw-Hill publications on the Pacific Coast, died in San Francisco June 25. Mr. Gardiner in 1917 gave up his own advertising agency in Los Angeles, which had been very successful, to take charge of advertising in the Pacific Coast territory for the McGraw-Hill Publishing Company, at that time publishing seven journals. He rapidly built up the advertising department on the West Coast and, as the company acquired new papers, took



H. W. L. GARDINER

on responsibility for the additional accounts that thus were added to the list. In recent years, in conjunction with **H. C. Worden**, Mr. Gardiner effectively handled the Western advertising accounts for all fifteen McGraw-Hill publications, making his headquarters at San Francisco. In the course of frequent trips over Coast and Mountain states during his eight-year period he made friends very extensively, and his passing will be felt as a loss throughout the West. Mr. Gardiner's death came unexpectedly and while he was in excellent health except for somewhat impaired eyesight. An operation for this eye trouble developed complications, and his death occurred only a few days later.

**Wilbur F. McClure**, state engineer of California since 1912 and head of the state department of public works, died suddenly June 22 while on a field inspection trip. During his service as state engineer Mr. McClure gave particular attention to water resources and irrigation development. He represented California at the conference of seven Western States at which the Colorado River Compact was framed.

**J. B. Struble**, electrical engineer and well known as the inventor of the application of alternating current to railway signal systems, died in Los Gatos, Calif., recently, as the result of a cerebral hemorrhage. Mr. Struble perfected his invention while engaged in the construction of the North Shore Electric Railway between Sausalito and San Rafael, Calif., while in the employ of John Martin.

**Carl Will**, manager, Fobes Supply Company, Portland, Ore., died in that city June 13.

## TRADE NOTES

**Signal Electric Manufacturing Company**, Menominee, Mich., recently appointed **William J. Tideman** general manager. Mr. Tideman was factory manager and purchasing agent of the company for the past three years before receiving his appointment as general manager.

**The Hazard Manufacturing Company**, Denver, has moved into new quarters at 2125 Blake Street, that city.

**The Timken Roller Bearing Company**, Canton, Ohio, has closed its branch office at Baltimore, and in future the service requirements of the Timken customers will be supplied through the Richmond, Pittsburgh and Philadelphia branches.

**Tork Company, Inc.**, New York City, now is occupying the entire fourteenth floor at 12 East 41st Street, that city.

**Franco Electric Company**, Sherman, Calif., now is located at its new address, 8941 Santa Monica Boulevard.

**Faries Manufacturing Company**, Decatur, Ill., is marketing what is claimed to be a new improved type of showcase reflector. It is neat and compact with a special holder which permits the reflector shade, 6½ in. long, to be rotated on the socket so that light may be spotted on the merchandise at any angle. It is finished in nickel plate with inside reflecting surface of frosted aluminum.

**Savage Arms Corporation**, Utica, N. Y., has bought the capital stock of the **Savage Distributing Company** of California and will operate on the Pacific Coast, dealing direct with dealers in the sale of Savage electric washing machines and ironing machines. The **Savage Distributing Company** will function as a subsidiary of the **Savage Arms Corporation**. Its officers are: **Charles W. Adams**, president; **F. R. Phillips**, vice-president; **H. L. Adams**, secretary-treasurer. Offices are maintained at 231 Rialto Building, San Francisco.

**The Waters Genter Company**, Minneapolis, Minn., announces the placing on the market of a household automatic toaster similar to the automatic "Toastmasters" which have been supplied to the restaurant trade for the past six years. The new toaster, which is fully automatic, will be marketed through jobbers and will retail for approximately \$13.50.

**The Wiremold Company**, Hartford, Conn., has issued a chart on the Wiremold conduit system for surface wiring. Much valuable information is contained therein on conduit and fittings, installation suggestions and dimensions. Photographs of fittings with their catalog numbers are shown as well as extensive drawings with complete information as to installation.

**The U. S. Electrical Manufacturing Company**, 200 E. Slauson Avenue, Los Angeles, has issued bulletin No. F 476 describing its new line of Auto Start ball-bearing motors. This new type of motor obviates the use of hand starters or compensators, only a simple switch being required.

**The Brown Instrument Company**, Philadelphia, has published an 80-page catalog on Brown pyrometers for the accurate and efficient measurement of high temperatures. The catalog is illustrated lavishly with photographs and the subject is covered in detail. Complete price lists also are included.

**Morehouse Machine Company**, York, Pa., has announced the development of an apparatus and bending test system for testing the springiness of magnet wire by the **Allied Magnet Wire Corporation** of Indianapolis. By means of this system, known as the **Allied-Morehouse** system of sampling and testing, the magnet winder knows just what maximum springiness number is suitable for his particular form of coil, the purchaser specifies it in his order, the wire-maker or the insulator knows just what to ship. It all saves time, expense and possible controversy, according to the manufacturer.



Look where the city limits of Los Angeles have moved to now! **Luke R. Story** (left), general superintendent, is telling **Fred Norcross**, general manager of the **Home Gas & Electric Company** of **Greeley, Colo.**, that it do beat all how Los Angeles spreads—the advertising. "Here we are neighbors of the Southern California Edison and didn't know it," says **Luke**. "Glad to welcome you, **Busy Buttons!**"

**Allen-Bradley Company**, Milwaukee, has issued announcements introducing the new **Inducto-therm** relay being manufactured by the company. Many advantages are claimed for this new product. Photographs and diagrams are given.

**Electro-Kold Corporation**, Spokane, Wash., has appointed **Herbert J. Mayo** to represent it in all of the northern California territory. Mr. Mayo's headquarters will be in **Oakland, Calif.**

**Harold E. Trent**, Philadelphia, has developed a new feature in melting pots, which will include a 45-lb. pot controlled by a 3-heat switch and separate plug connection. This pot has been adapted not only for ladle and dipping work but also for pouring, as a spout and handle are part of the standard design.

**Triangle Conduit Company, Inc.**, Brooklyn, N. Y., has announced a new tool for stripping armored cable. The tool is a pair of steel pliers, 11½ in. in length, weighing 2 lb. It will strip any single strip-armored cable in sizes 14/2, 14/3 or 12/2 without adjustment. The wireman slips the tool on the cable, opens and closes the handles, and the operation is complete except for sliding off the steel. The tool has an auxiliary pair of wide-mouth pliers and a cutting device which cuts wire, cable or non-metallic conduit up to ½ in. outside diameter.

**W. N. Matthews Corporation**, St. Louis, has issued a new booklet known as bulletin 501, which describes **Fu-switches** and disconnecting switches. A complete review from the time **Fu-switches** were introduced up to the present day is contained in this booklet. Copies of the bulletin may be obtained by addressing the company at 3708 Forest Park Boulevard, St. Louis.

**Lincoln Electric Company**, Cleveland, has had prepared a film showing the use of welding in structural work. Contents of this film are based on the actual construction of the **Peerless Auto Sales Company** of **Canton, Ohio**, the first all-welded building to be erected in the United States. The owners of the film have arranged to allow technical societies, engineering schools, Chambers of Commerce and like groups to exhibit the film.

**Andris Electric Company**, Tacoma, Wash., is featuring a new electric water heater, which it claims is the smallest and most compact water heater on the market, being 6 in. long and 2¾ in. in diameter and weighing about seven and a half pounds.

**Circle F Manufacturing Company**, Trenton, N. J., has appointed the **Murphy Company**, 902 Georgia Saving Trust Building, Atlanta, Ga., its representatives in North Carolina, South Carolina, Georgia, Florida, Alabama and Tennessee.

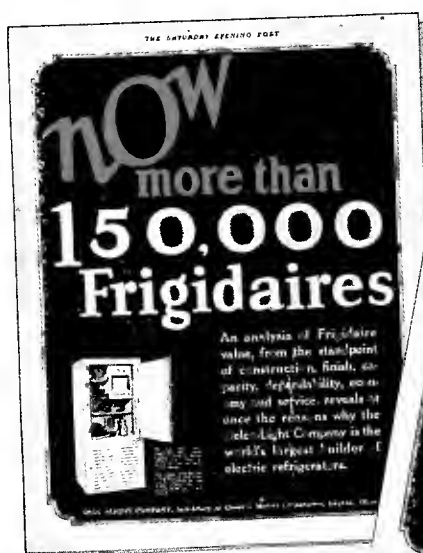
**The Maytag Pacific Company** recently held in Seattle a convention of executives and salesmen, at which **Walter G. Sloat**, president, and **T. P. Tollefson**, secretary and treasurer, were present. **G. W. Oberg**, vice-president of the company, and in charge of sales in the Seattle district, was host to the convention, which concluded with a banquet at the Olympic Hotel.

**Graybar Electric Company**, New York City, has issued a booklet on housekeeping appliances, the purpose of which is to provide electrical dealers with complete information on **Graybar** housekeeping appliances. It is a combination of catalog and sales manual for it gives in concise form the important selling points of the appliances illustrated with photographs.

**General Electric Company**, Schenectady, N. Y., has issued a 15-page bulletin No. 304 on portable recording instruments for alternating and direct current. Complete details, together with photographs and diagrams, are given in the booklet.

# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES



May 8<sup>th</sup> 150,000 -

July 3<sup>rd</sup> 200,000



*This modern 'ice man'  
calls once—with Frigidaire—  
and the ice stays always*

THE May 8th issue of the Saturday Evening Post announced that there were then more than 150,000 users of Frigidaire Electric Refrigeration.

The July 3rd issue of The Saturday Evening Post carries the announcement "Now two hundred thousand Frigidaires."

An increase of 50,000 in only two months. We repeat now what we said then—that the enormous growth in Frigidaire sales constitutes the best proof that "the public Utility's greatest opportunity for profit in the field of electric refrigeration will be found in the Frigidaire franchise."

DELCO-LIGHT COMPANY, Dept. N-52, DAYTON, OHIO  
Subsidiary of General Motors Corporation  
DELCO-LIGHT COMPANY, Public Utilities Division  
285 Madison Avenue, NEW YORK CITY

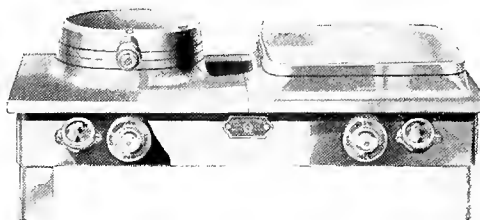
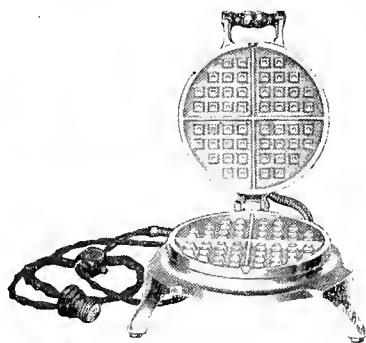
## Frigidaire

ELECTRIC REFRIGERATION

# Why These and Other Leading Manufacturers Use Chromalox Heating Units Exclusively



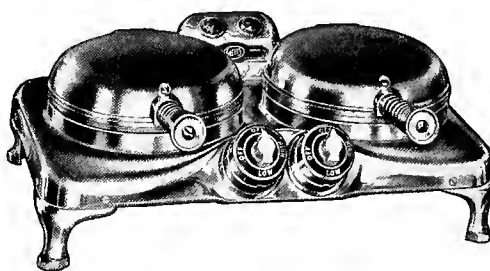
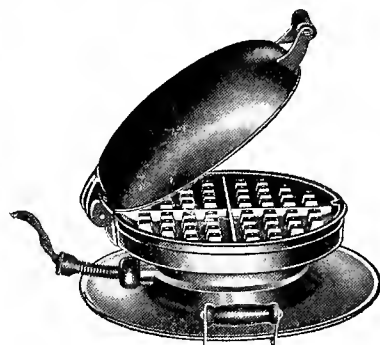
The Griswold Manufacturing Company of Erie, Pennsylvania  
*Use Chromalox Units Exclusively Because—*



Chromalox units have broken every record for operation under the most severe conditions.

Result: Heating units that outwear all others—no replacements. Operation that completely satisfies everyone concerned—maker, jobber, retailer and customer.

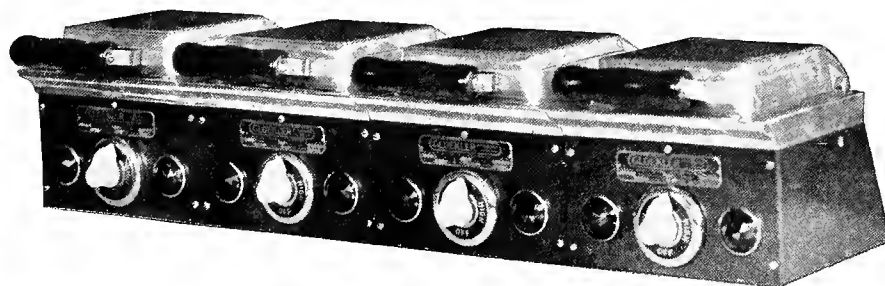
The Wells Manufacturing Co., of San Francisco, California  
*Use Chromalox Units Exclusively Because—*



Chromalox units have broken every record for operation under the most severe conditions.

Result: Heating units that outwear all others—no replacements. Operation that completely satisfies everyone concerned—maker, jobber, retailer and customer.

The Gloekler Manufacturing Company of Erie, Pennsylvania  
*Use Chromalox Units Exclusively Because—*



Chromalox units have broken every record for operation under the most severe conditions.

Result: Heating units that outwear all others—no replacements. Operation that completely satisfies everyone concerned—maker, jobber, retailer and customer.

# CHROMALOX HEATING UNITS

MANUFACTURED EXCLUSIVELY BY

EDWIN L. WIEGAND CO., 422 FIRST AVENUE, PITTSBURGH, PA.

Sole Canadian Licensees—The Canadian Chromalox Co., Ltd., 251 Queen Street East, Toronto, Ontario, Canada

Pacific Coast Representatives—The Electric Material Co., Inc., 589 Howard St., San Francisco, and 434½ East Third St., Los Angeles, California

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IN THE ELEVEN WESTERN STATES

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W. A. CYR, Associate Editor  
B. H. SNOW, Northwest Editor

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Coal Age Radio Retailing Power



## Subscription Paid to Year 2226

ONCE in a while the editors receive a letter from a reader either commending some item in accord with the reader's views or else pointing to some inadvertent error. The following letter, except that the Journal was right and that the truck DID set at such an angle, is an example of both in one. And its last sentence has brought the satisfaction that through its columns the Journal may perform a service to those engaged in the industry, although they be in Buenos Aires. The letter is as follows:

Buenos Aires, April 29, de 1926.

Journal of Electricity,

Dear Sirs: I enclose clipping from your issue of Feb. 15, 1926, which shows very clearly that your editor is not a botanist or he would have noticed the direction in which the grass is growing. Also he is not a phytologist or he would have noticed the water bag is not standing vertically and keg of nails should not stand on the angle shown.

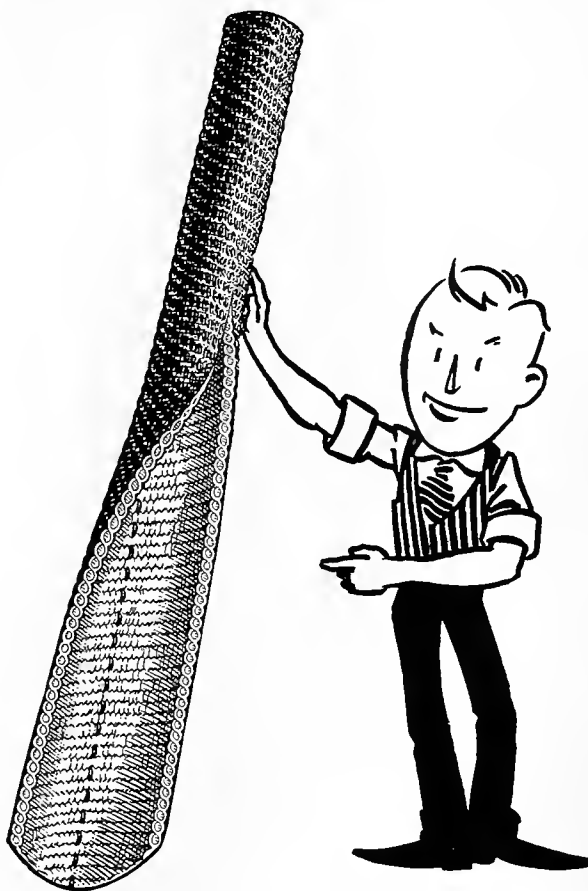
It is a pretty picture, however, and I like to see that somebody is smart enough to put something over on you.

In order to soften the blow, I am pleased to tell you that I get a great deal of satisfaction from your journal besides the mere money we make out of connections secured from reading your advertisements. The profits of one transaction which resulted from your advertisements would pay our subscription well into the twenty-second century.

Yours very truly,

NEW YORK STEEL EXCHANGE, INC.

MARK R. LAMB,  
Presidente.



# DURADUCT

Reg. U. S. Pat. Off.

*The Fast Fishing Loom*

*—with the original Single Wall  
and the Roller Bearing Wireway.*

*It sure does cut Labor Costs*

*Dura Bill*

TUBULAR WOVEN FABRIC CO., PAWTUCKET, R. I. *Makers of DURABILT Products*

*Pacific Coast Representatives*

**ALLIED INDUSTRIES, INC.**

455 Second Street,  
San Francisco

305 Ninth Street,  
Oakland

1256 Factory Place,  
Los Angeles

53 Fourth Street,  
Portland

532—1st Ave., South  
Seattle

# EDITORIAL

## The Edison 100,000

### Mark Is Reached

**C**ULMINATION of a remarkable customer-ownership campaign to secure 100,000 stockholders for the Southern California Edison Company was brought about recently when the one hundred thousandth shareholding was sold to a lad of eight years. The facts that the one hundred thousandth stockholder was a boy and that the goal had been reached were interesting sidelights only of the truly important fact that the Edison company had reached its goal through the efforts of its own organization, its officials, its employees, and, more important, its previous stockholder-owners, none other than its customers.

One of the first companies to extend its ownership to its customers, and always a company which gave to all of its shareholders, both of common and preferred stock, full voting privileges, the Edison company now has added to its distinguished record the first achievement of 100,000 owners.

Of the more signal features of the campaign is the fact that nearly 30,000 of the new stockholders were added in this campaign. On May 15, 1925, at the beginning of the campaign, the Southern California Edison Company numbered its stockholders at 71,300. By September there were 80,000, and, as the year closed, the number was growing into 90,000. The remaining 10,000 shareholders were obtained during the past few months, culminating gloriously the campaign begun a year ago, sponsored by "The 100,000 Club" of Edison employees.

The Edison company ownership will stand as one of the most convincing and irrefutable arguments that the utilities of California are publicly owned through the one true and responsible ownership of the public as individuals, under public regulation and sane business administration.

## Introducing an Old Friend to Mr. California Voter

**S**UFFICIENT signatures have been obtained to place the justly famous (and, we might add, iniquitous) five-hundred-million-dollar California Water and Power Act on the November ballot in that state for the third successive time. Figures recently issued by the Secretary of State show that a total of 82,318 voters signed initiative petitions at the behest of solicitors who not only received an average of ten cents for each signature secured but also employed devious methods of misrepresentation to secure these names.

While the perseverance of the sponsors of this proposed constitutional amendment in placing this

measure before the public in the face of two overwhelming defeats is to be marveled at, the scheme of government which allows such a procedure is to be deplored. The proponents of the initiative and referendum amendment to the California constitution, as in other states, secured its approval on the basis that it was a much needed reform through which popular government would be assured. The experience to date with the Water and Power Act effectively shows up the many weaknesses of this governmental procedure. Despite the fact that this act has been twice defeated by a majority of more than two to one with an even greater majority against it in 1924 than in 1922, this year the taxpayers will be put to the expense of carrying the measure to the electorate for a third time simply because a group of political theorists possessed sufficient funds to employ solicitors, who in turn influenced the necessary 77,263 voters to affix signatures to the initiative petitions. Thus 77,263 voters are able to thwart the expressed will of the 751,885 voters who in 1924 declared that a socialistic program such as that proposed by the act had no place in California. It is obvious that the initiative, rather than giving expression to the will of the majority, affords to the minority an opportunity to take an active part in government.

Since there is no correction for this system, at least at present, it would seem that both the voters and business will continue to be harassed with Water and Power Acts and other similar iniquitous legislation for years to come, or until such time as the initiative is eliminated from the process of government.

## Public Relations from the Standpoint of Public Regulation

**I**N adding a valuable contribution to the public relations literature of the electric utilities, Lester S. Ready, chief engineer of the California Railroad Commission, has made some criticisms of a highly constructive nature. His address before the recent convention of the Pacific Coast Electrical Association, excerpts from which are presented on another page of this issue, emphasizes a side of the public-relations question to which too little attention has been given.

To make his point that there is a definite relationship between good public relations and successful regulation, Mr. Ready may have trodden roughshod upon the toes of certain individuals. These men may glean a certain measure of satisfaction from the fact that they are not the only ones who have transgressed. Only by being frank and sincere could Mr. Ready make his message plain.

One or two of his statements are worthy of repetition purely from the standpoint of emphasis. In discussing the tendency of utilities to make an alibi of the commission he says, "The Railroad Commission will take the responsibility for its acts of regulation. Be sure you take your responsibility for your acts of management." Such a straightforward statement requires no explanation. Speaking of rewards for efficiency, a subject which is demanding more and more attention, he states, "It is becoming realized that public regulation cannot assure a continuing return even with efficiency of operation, nor can it grant rewards for special and outstanding efficiency to a company which does not have the confidence of the public it serves. When you believe you are entitled to reward for efficiency, be certain that the public-relations department of your company has been as efficient and effective as you believe your construction and operating departments have been and that your company has the good will of the public it serves."

Coming from an unbiased yet highly interested source, such statements are doubly valuable to the industry. No opportunities should be overlooked to have either Mr. Ready or speakers of his type address meetings of the industry at more frequent intervals.

#### Misstatements Which Must Not Be Overlooked

**L**ACK of definite information has led to a number of popular misstatements regarding electricity in the combating of which the industry has been entirely too lax. It is common to hear a layman say, "Electric rates are too high." When asked if he knows what the rates are, this member of the public invariably will answer, "I don't know, but they are too high." This man should be shown immediately that rates are lower on the Pacific Coast than in any other section of the United States, on an average, lower than any other place in the world.

Another layman may be heard to pronounce, "It costs too much to cook with electricity." In nearly every case questioning will show that electricity is not used for cooking in his home. He should be told that records show that the average monthly cost of cooking with an electric range varies between \$3 and \$5 per month, according to the size of the family.

When the remark is made that "Electric heat costs too much," find out what the present fuel bill in that man's home is. He will not be able to tell you. If he does not know what his own fuel costs are, how can he say that heating with electricity is too expensive? Electric heat, properly applied and used, is economical.

Perhaps the layman will state that under government ownership rates are lower and service better. This statement should be disproved immediately. Every man or woman in the electrical industry should be capable of combating such an argument as this. Average rates are not cheaper and service is not better, without mentioning any of the many disadvantages which accrue with government ownership.

Statements such as the above are heard every day—on the streets, in clubs, in street cars, wherever groups gather and converse. It is to the advantage of every member of the electrical industry to see that those statements are answered immediately, for by repetition they soon will become accepted facts.

#### The New Republic Tries to Steal a Ride

**P**OWER has been discovered by the New Republic. Its intelligent young men, bent upon remaking the world according to Omar Khayyam pattern, namely: "break it into little bits and then, remould it nearer to the heart's desire," have decided to operate upon power, now that someone else has gone to all the nasty bother of inventing, designing, building and operating power systems. The really dirty work has been done, so it is meet that a little of the surplus of intelligence, hitherto sloshed liberally over birth control, Soviet Russia, Senator Brookhart, Gifford Pinchot, little theatres, psychology and Dr. Freud, be laved over the subject of power. It looks as if power were going to be a going proposition. It is time to steal a ride on its bandwagon, and, if possible, throw a little intelligent dust upon the axles as it goes along.

With headline type in a recent number the New Republic announced an imposing list of names, each of whom was to give the great "truth" about power. Having cornered O. C. Merrill, secretary of the Federal Power Commission, for one article sanely stating the effectiveness of federal regulation in the Conowingo development, the magazine then surrounded him with a galaxy of writers whose qualifications for the job seemed to be based upon their lack of any previous intimate contact with electrical development. These men largely were college professors in economics, social workers, and employees of some of the numerous bureaus with which government now is so generously adorned.

Yet who the young gentlemen are is hardly in point. What they have to say is the criterion by which their presence in New Republic's "power" supplement may be best judged. Except for Judson King, one of the chief philanthropic economists and experts of the Townley scheme for an utopian North Dakota which failed to "utope" in the right places, the galaxy is composed of writers who as yet have their reputations to make.

The subject of power development and control of utilities is very cunningly introduced by means of a summary editorial, at the foot of which is a table. This table is an ingenious device. It appropriates a number of base figures on power production, population, capitalization, revenues and lighting rates for the years 1920 to 1925 from the Electrical World. From these it deduces that the cost of power now as compared with 1920, using the purchasing power of a dollar as a basis, is 21 per cent higher. This is a clever trick, and no doubt will be used to advantage by all advocates of government ownership quite liberally in the future.

If figures had been based on 1913 values, the



values existing in normal or pre-war times, the results would have shown what everyone in the electrical industry knows, namely, that electric costs are lower now than at that time. But by basing costs at the peak of war prices, 1920, when the purchasing power of the dollar was very low, costs of living high, and electric rates only slightly higher than at present, it is easy to show that the present rates are comparatively high with respect to a dollar that now buys more than it did in 1920. Because electric rates never rose very high even in peak-price times, these gentlemen feel that it is perfectly fair and honest to claim that they have not come down in comparison with living costs.

Among the articles themselves one finds much viewing with alarm of the growth of the industry and much concern over regulatory measures. One of the charming ideas put forth is that four strongholds of government ownership should be established to serve as a **model** for private power companies and to restrain them by competition. These fortresses are designated as located at Seattle, where municipal ownership already has floundered about considerably and cost increasingly more; at Los Angeles, where niceties of bookkeeping provide alluring "profits" (and Boulder Dam is to be thrown in gratis); at Muscle Shoals, where the government has been fiddling away money and time for eight years building a project which private enterprise might have had delivering power to the South for six of those eight years; and on the St. Lawrence, where Governor Smith of New York wants to play.

Much is made of the unequal conditions of regulation in the various states, but nothing is said of the efforts being made to unify and extend the powers of regulatory commissions to cover every possible phase of utility activity wherein abuse might exist. There is glib talk of "Giant Power," with its ideal large-scale development by some master mind, disposing easily, if not economically or actually, of the numerous by-products derivable from steam-plant operation, the sale of which, it is held, would provide power generated from fuel which costs nothing. There is easy-going talk of the projects that could be cheaply financed, IF the taxpayers would guarantee the stipulated returns.

One writer is greatly concerned over holding companies, and yet he admits naively that the leaders of the industry themselves are concerned with certain problems relative to holding-company operation. These men have issued warnings, too, but they have gone about to find ways to remedy them constructively. The industry may be relied upon, upon the record of its past, to heal its own wounds. Good business dictates that no unsound condition be allowed to exist lest it destroy the whole carefully built structure.

Another writer goes out of his way to devise curious interweavings of ownership. He charges the General Electric Company with ownership of stock in almost everything. He has not analyzed far enough to see that much of this ownership is held by that company's employees' investment company, and there is just as much sense in his accusation as there would be to say that the railroad

locomotive engineers own almost all the industrial enterprises in the country because their brotherhood banks own stock in anything that is a sound investment.

The sideshow is provided, however, by Walter Durand, of the People's Legislative Service, and Judson King, who now disports as secretary of the National Popular Government League. Both indulge in the well known acts known as figure-juggling and slack-wire financing. How gloriously they throw about some of Ontario's choicest rates as compared with rates in Little Rock, East St. Louis, and Knoxville! Seattle's rates, too, are held up for public admiration, and nasty insinuations are made as to what robbers private utilities must be.

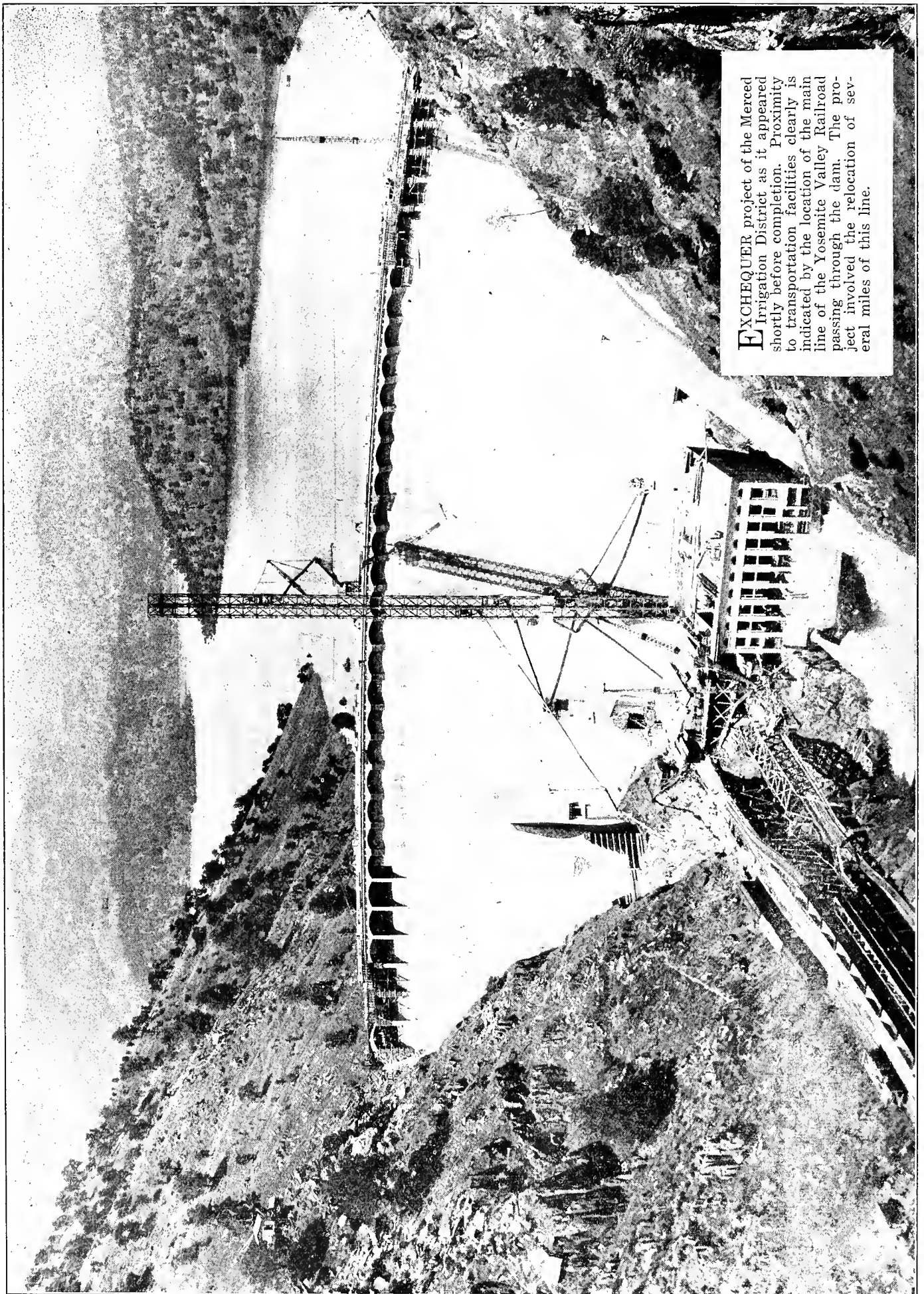
Mr. Durand gives it all away, however, when he says, "The cost of construction of a public power system is a matter of bookkeeping." He infers that because distribution costs are high, "this is a strong reason for public experiment in distribution," overlooking the fact that the public, through its governmental agencies, never experiments in anything, much less lowers the cost of anything that provides more and more jobs for the faithful. Mr. Durand's remarks could be given the benefit of considerably more space than his "intelligence" upon public ownership would justify.

Intelligent criticism is helpful. Some of the material in the New Republic, be it said in justice, is criticism of this order. Yet the solution offered by the New Republic for the problems it succeeds in making of the power question is not only open to question—it has been tried and has been found a failure since government enterprise built the pyramids of Egypt. And the very governmental operation which the New Republic champions on one hand it denounces on the other. There is no organ today so loud in its outcry against politics and political chicanery.

Can the New Republic and its audience of intelligentsia consistently desire **more** governmental activity for politics to play with when it itself is so disgusted with politics that it says so in these words in another column:

"Fear of losing out in the political sweepstakes, distrust of their political foes and themselves, hunger for personal and sectional aggrandizement, satisfaction over any order which benefits them, no matter the hardships it works on large bodies of the electorate, unwillingness to bestir themselves in new or altered fields, subordination of the nation's needs to their own desires, worship of a cause or movement that might suffer from change, and a general forgetfulness of the ordinary demands of decency and justice—these are the petty factors which entered into the refusal to provide equal representation and make all honest men wish that Patrick Henry, too sparing of his adjectives, had based his defiance of an autocracy just as blind and stupid on the ground that 'taxation without **proper** representation is tyranny.'"

Thus was written the New Republic's own refutation of its contention that government be further extended to make power development a political toy.



**E**XCHEQUER project of the Merced Irrigation District as it appeared shortly before completion. Proximity to transportation facilities clearly is indicated by the location of the main line of the Yosemite Valley Railroad passing through the dam. The project involved the relocation of several miles of this line.

# Public Relations Under Public Regulation

By Lester S. Ready\*

Chief Engineer, California Railroad Commission, San Francisco

PUBLIC relations has been the subject of much discussion at conventions of public utilities throughout the country for a number of years. Each year sees the subject given more serious consideration. The apparent lack of public confidence or public good will has given many of the utilities serious concern with the result that in most of the progressive utilities of today special departments have been created to consider ways of improving public relations. It is well that this has been done, for it is apparent from a study of the whole question of public-utility operations that public confidence and good will are as important to the continued success of a regulated public utility as of private commercial enterprises.

Believing, as I do, in the importance to public utilities of retaining the good will of the public and its importance also in the scheme of sound regulation, I feel that possibly the presentation of an analysis of the problem by one connected with regulation may be of benefit in the better service of the public.

Much progress in the development of good public relations, on the part of the utilities, has been made. In many places the utilities have made a business of improving public confidence and public good will. The public has been informed and has gained a better appreciation of the utilities. The utility men have gained a better appreciation of the desires, wants and rights of consumers and the public in general. Much progress has been made, but the opportunities and responsibilities for advancement in this field are still great. It is no time to be self-satisfied. In some quarters a full appreciation of the value to the utilities of better relations is thoroughly understood. On the other hand, one is surprised at times to see the lack of sincere and honest application of the principles involved; half truths still are put out, misinformation presented to the public and to the commissions, sharp practices indulged in, with the result that a distrust on the part of the utility consumers continues.

Utilities have had a problem to contend with in creating and retaining public confidence. Unfortunately, due to the acts of some utilities, the reputations of utilities in general were besmirched by

*IF frank, sincere, constructive criticism is good for the soul, then Mr. Ready's comments on the definite relationship between public relations and regulation should have a beneficial effect upon the utilities. Standing as he does between the utility and the public, he has been afforded an opportunity to observe much that has escaped the attention of utility men and in this article he presents his views on a highly important subject.*

the phrase "The public be damned." I am certain that many utilities did not and do not justify this, and yet there must have been considerable justification for it or otherwise it would not have been so hard to live down.

Unfortunately, during the early stages of public-utility regulation, a number of utility men so resented public regulation, considered it so unjust and such an infringement on their rights that they intentionally or unintentionally took

it out on their consumers. Many cases came to my attention in the early days of effective regulation in California where utility employees, and sometimes executives, treated those who brought complaints to the commission in a most unfortunate way and misapplied rules promulgated for the general benefit of the public to discredit regulation. These acts did not help to overcome the prejudice of the public, and in many cases brought serious trouble upon the utilities involved.

The existence of numerous complaints regarding rates, the serious opposition to justified rate increases, together with the threat of public ownership of public-utility properties brought out clearly the absolute necessity that public utilities have the fullest public confidence and good will if their profitable existence in public service was to continue.

The public utilities are probably the most extensive retail-credit enterprises that we have. The nine largest electric utilities in California serve 1,100,000 consumers. Of this total, approximately 900,000 are residential lighting consumers, whose average bill is less than \$2 per month per consumer. The service is rendered on a monthly credit basis. How many retail dry goods stores handling credit accounts do or could do business on an average monthly bill of less than \$2? The service rendered is a necessity. The dealings are primarily with individuals. The use of the public streets brings the utilities in direct contact with those elected to represent the public politically. On every side and in practically every phase of its activities the public utility comes in direct contact with the public, individually, in groups, and politically. It is, therefore, axiomatic that the utility must obtain and retain the public confidence and good will.

The public utility is, of necessity, not a temporary enterprise. Every dollar of annual gross revenue

\* Excerpts from an address before the Public Relations Section, Pacific Coast Electrical Association, Los Angeles, June 11, 1926.

requires a capital investment of from \$4 to \$5. Rates are not made to amortize the investment; the public necessity demands a service continuing into the future. Once in the business, there is no way out for the business. The owners may get out by sale or be forced out by condemnation. The obligation to expand demands the continual addition of capital. The success of the utility, therefore, depends upon the continuing profits that it may make in rendering the service that it supplies. Lasting public good will will aid the obtaining of continuing return.

The monopolistic nature of the public utility demands a higher standard of courteous service and it calls for greater public good will than the competitive enterprise. As part of the public, we can stand some incivilities on the part of a storekeeper if we can trade somewhere else should we desire, but we balk at the same treatment when that option is taken away. "To have to" goes against our American makeup. Because the utility is primarily a monopoly, it has to contend with the suspicion that exists in most of us that excess profits go with monopolies. For these reasons a high standard of service, a high standard of ethics and a high standard of treatment under the conditions of privately owned monopoly are required.

#### Good Public Relations Essential

Good public relations is essential to publicly regulated utilities. May I quote from the report of Franklin Griffith in an address before a recent meeting at Seattle? He stated in part:

"In this industry we are going ahead steadily by tremendous leaps and, if we progress as we should, we must not lose sight of the fact that our growth, our success, depends, even to a greater degree than on the efficiency technical men may bring into our affairs, upon that most powerful thing, the good will and confidence of the people."

Good public relations represents the good-will value of the utilities; continuing return is assured and more prompt relief is obtained when rates must be increased, and complaints for reduction of rates do not occur or are delayed. The nullifying of all of the efforts for efficiency and economy which are carried out by technical and operating men has frequently occurred. At this point, I wish to speak a word of commendation of the efforts of technical and operating men. They have rendered and are rendering a great service to the utilities and to the public. Their conscientious endeavors in the several companies and in their technical committees, if better known by the public, would instill confidence. No company is acting in good faith to its technical and operating men that does not gain and retain the good will of its customers.

An instance of the cost of bad public relations comes to mind in the case of a manager of a utility division whose division had a record for efficiency and economy. He was loyal to the company until he was actually hurtful to its interests. He eliminated the niceties of public relations to save money. He was so loyal to the organization that he resented any criticism of it; he took issue and would argue

with any consumer who questioned the correctness of estimates of the cost of extensions or statements submitted. His organization reflected somewhat the same attitude. What happened? Complaints were filed attacking rates; not because they were burdensome but because of the resentment of the public to the treatment received.

An instance showing the effect of good public relations also comes to mind. One company during the war period had applied twice for increases in rates. Its public relations was good. The applications asked for reasonable and justified increases. There were no protestants appearing at the hearings. An analysis and study by the commission was not delayed by long public hearings and the justified increase was obtained without delay.

#### Examples of Unsatisfactory Public Relations

Another company that was managed from a distant city had unsatisfactory public relations. The manager of the company was generally antagonistic to regulation and to criticism by the public. This attitude was reflected throughout the organization. At one hearing, with a court room packed with protestants (I believe mainly because of their treatment and not because of a pending increase in rates), he proceeded to call them down. An increase was necessary and legally justified. The commission granted the justified increases and subjected itself to considerable criticism by the public. The transfer of criticism to the commission did not reduce that against the company. Later the company's head office was transferred to the community served and a man who believed in fair treatment and confidence and honesty with his consumers was placed in charge. About a year later a further increase in rates was required. The city attorneys of the communities served came to the hearing and said in effect, "We do not know what the company is entitled to, but whatever the commission decides is fair will be acceptable to us." All the difference was due to the difference of public confidence.

There are certain utilities today operating at less than what might be classified as a fair return, which, I believe, could materially reduce their expenses—certainly their legal expenses—and materially improve their earnings if they would but be more considerate and more courteous. Good public relations hastens and makes more easy the doing of justice when increase in rates is necessary, and postpones complaints and even eliminates them. Bad public relations and poor service are more often a cause of rate complaints and the holding of companies to a limited return than are excessive rates.

The results of bad public relations, lack of confidence on the part of the public, though generally not as immediate in their effect upon the utility, are, in the ultimate, as serious as in a competitive enterprise. The fact that the detrimental results are often postponed tends to lull many into a lack of realization that they exist. The inability of the consumer to cease taking service, when ill treated, prevents the effect showing on the balance sheet of the company at once, yet the resentment of ill treatment develops and grows. It shows as vig-



orous protest to any increase in rates when found necessary and fosters and makes converts to public ownership.

The public confidence and good will essential to public utilities must be based on the strictest honesty, upon courtesy, including sincerity and consistency. High-pressure salesmanship fails in public-utility service because it is not lasting. The class of salesmanship that may work in enterprises of less permanency, or that are competitive, is often not applicable either. Unless a development of public confidence and good will is based upon the highest integrity it will fail in time. The utility will bear the loss when that time comes.

The sale of stock to customers has had a most beneficial effect, both in making the customer interested in the company and in bringing home to the utility men the necessity of consistency. As a result the former practice of shedding tears of despair at rate cases that changed into the radiant smile of hope and assurance as the stockholders and bondholders were met has had to be discarded. A more consistent and sincere statement of facts is being presented and tends to develop confidence. There still exists, however, on the part of bond and stock sales companies, a willingness to touch up the portrait that must some day be eliminated. The "customer-ownership of stock" has had as much of a beneficial effect on the utilities as it has had on the customers.

A few years ago there developed a tendency to stress to the public the great importance of the public-service corporations in the public welfare and development of the community; this, in some instances, went to the extreme of boastfulness. The utilities have reason to be proud of the part played, but many believe that if the very foundation of the prosperity of the community depends upon the utilities they should be owned by the public.

#### Reward for Efficiency

Some utility men have had the idea that under regulation nothing could be gained by efficiency or by better public relations; that the results of efficiency were or would be taken away from the companies and that good will was less important than legal rights. This has been a most unfortunate attitude, and it has been detrimental to good public relations. The problem of rewards for efficiency has been one seriously considered by regulatory men. Normal improvements in efficiency and development in the art are expected under the normal fair return. Failure to keep up with progress of developments will ultimately result in reduced returns. It is becoming realized that public regulation cannot assure a continuing return even with efficiency of operation nor can it grant rewards for special and outstanding efficiency to a company which does not have the confidence of the public it serves. When you believe you are entitled to reward for efficiency, be certain that the public relations department of your company has been as efficient and effective as you believe your construction and operating departments have been and that

your company has the good will of the public it serves.

Inter-company cut-throat competition of the pre-regulatory type is not conducive to good public relations under regulation. Back-yard fights over business do not improve a utility's reputation for non-discrimination nor help the public's acceptance of regulated monopolies. Such practices are amusing though most unfortunate.

#### Trust and Confidence Required

It would seem to me that trust and confidence between utilities might aid in creating a greater trust in utilities by the public. When one sees two companies in contest as to rates or territory, one begins to doubt whether either should be trusted at all.

A practice existing among certain utilities that is regrettable is the retention of inefficient and expensive plant or equipment which should be replaced or abandoned, in order to keep the higher capital in the rate base. Some instances of this may get by temporarily unnoticed by the commission and the public and the individuals who propose these schemes may consider themselves serving their companies, but as long as the companies do not "come clean," confidence cannot be expected. The sooner this practice is eliminated and the companies come forward with nothing to cover up, with no family skeletons, the sooner they may expect rewards for outstanding efficiency. The practice, if continued, may gain in a few instances, but on the whole it is not sound policy.

The problem of maintaining good public relations increases with the size of the utility. The electrical utilities have grown by consolidation and expansion until individual companies cover large portions of the state and serve many municipalities and districts. There has been a tendency to centralize control and operations until the local managers and local officers must refer many of their decisions to the head office. People like to deal with men who can say "Yes" and "No," not with a "I must refer it to the head office" type of man. Centralization of authority results in centralization of responsibility and encourages and fosters, in the parlance of the street, "passing the buck" by the local representative. Every local district should be a unit in itself, at least so far as the public is concerned. They must be the company to the people and be an integral part of the local community.

#### Making an Alibi of the Commission

There has been too great a tendency on the part of many utilities to make an alibi of the Railroad Commission. Too often, when it is not desired to do certain things, the consumer is advised, "The commission will not let us." The Railroad Commission will take the responsibility for its acts of regulation. Be sure you take your responsibility for your acts of management. "Passing the buck" to the commission may ease the way temporarily, but it detracts from the ultimate lasting public confidence necessary to a public utility.

If a utility wants justice done promptly and

continuously, public good will and confidence is a great aid in obtaining the same. Much can be done in the preparation for and presentation of proceedings to make it easier to do justice. If a utility finds it necessary to obtain a greater revenue through an increase in rates, good public relations will reduce the objection from its consumers and speed up the proceedings. Bad public relations results in long proceedings and ultimate dissatisfaction on the part of the public. The utility should first know in its own mind what it is entitled to and, considering all phases of the matter, what it can and should have. Then, if it asks for what it is justly entitled to and should and can reasonably receive, it should inform the consumers frankly and clearly of its needs and its request. Based on what it is justly entitled to, it has nothing to hide or misrepresent. A clear, concise and friendly presentation of its needs and a specific statement of its request will aid greatly. The legal side must, of course, be kept in mind, but, dealing with such a great number of consumers, this side should be held in the background and every reasonable effort made to inform the public as well as the Railroad Commission of the facts; what is desired is an increase in return not a law suit with additional expense and public dissatisfaction. Refusal to give information encourages suspicion and distrust. Willingness to assist protestants in the determination of facts encourages confidence. In many cases a frank statement to its consumers of the facts involved and how the increase will affect the bills of each individual consumer is beneficial. It is true that it may bring criticism on the company and opposition prior to the hearings, but that criticism and that opposition give the company an opportunity to tell the facts, to inform the public and, if its request is just, the public confidence will be increased. When the proceeding is submitted, the company's consumers will have had an opportunity to present their case; they will have had an opportunity to inform themselves; they will have had an opportunity to adjudge the company and to think over and anticipate what may result. Putting the "soft pedal" on applications for rate increases, failure to make a definite request and failure to inform the public have been detrimental to public relations. Surprises in the form of rate increases are unpleasant to the individual consumer. A resentment arises because it is felt that it was "put over." This condition breeds suspicion of the utility and of the regulating commission and stirs up resentment against the public utility and regulation.

Many public utilities make the mistake either of not asking specifically for what they want, fearing the reaction of the public and so letting the commission take the shock, or making claim far in excess of what they know (and in many instances the public knows) can be obtained under economic conditions, regardless of the legal right of the company to the amount claimed. Where an impossible request is made, the reaction on the part of the public is apt to be either that the utility is insincere or is a super-Shylock. Regulation may get some credit in disallowing the increase and does,

but even that credit is largely lost by that reaction that "no fool would grant the request anyhow."

### Regulation Has Public Relations Problem

Regulation has its own public-relations problem to contend with. It is doubtful whether it can indefinitely continue unless public confidence is retained. The doing of a duty, often in opposition to the public sentiment and apparent public desire, is unpopular, and regulation has had its share of unpopularity, but the success of regulation in California to date—and I am certain it has succeeded to as great an extent if not more than in any other state in the Union—has mainly been on account of the continuing ideal of justice and honesty which has guided the members of the commission and has been the foundation of its acts. It has sincerely and conscientiously searched for the facts and endeavored to do justice.

If the utilities believe in the principles of effective regulation and desire to see it retained, they can aid greatly by creating better public relations between themselves and their customers. What breaks down confidence in public utilities will have its effect on confidence in regulation. And what breaks down confidence in regulation under the present scheme of things will break down the confidence in utilities. Continuing sound regulation must be based on confidence. Bad public relations between the utility and its consumers creates distrust, makes unpopular decisions required by the limits of law or for the continuation of service, and results in criticism of regulation and loss of confidence. If the utilities believe in sound public regulation, they will exert every effort to create and maintain the confidence of their customers in them and in regulation. If they are not believers in sound public-utility regulation but are guided only by the selfish interest of business, they cannot, under the present scheme of things, afford to create a lack of public confidence in either themselves or regulation.

### A \$5,000,000 Stock Issue That Cost Only 22 Cents a Share to Sell

THAT customer-ownership stock sales have reached the enviable position of public acceptance and, what is better, public demand, has been given further support in the recent experience of the Pacific Gas and Electric Company in disposing of its issue of \$5,000,000 of 6 per cent preferred stock in seven weeks, and at a cost of only \$11,196.86 or a little over 22 cents per share.

The ease with which the stock was sold, as well as many other interesting and significant aspects of the distribution of ownership of the issue, may be considered indicative of the eagerness of the public to become shareholders in public utilities under the customer-ownership privilege. The stock was placed on the market in the latter part of December, 1925, according to A. F. Hockenbeamer, second vice-president and treasurer, and was sold out before the middle of February, 1926. Practically the only expenses incurred in the dis-

posal of the stock were in advertising in local newspapers, the salaries of the sales staff, and printing. Of the \$11,196 total cost of selling, \$8,606 was spent for advertising, or 17.21 cents

per share. The payroll of the sales staff was \$1,952, or 3.91 cents per share, while the stationery and printing amounted to \$637 or 1.27 cents per share.

# Results of A Typical Customer-Ownership Campaign

*Vocational List of  
Subscribers*

[illegible]

**A RECORD OF CUSTOMER-OWNERSHIP SALES**

JUNE 1934	—	APRIL 1935	
DIRECT SALES OF PREFERRED STOCK		PAY VALUE	
		423,500.000	
		17,100.000	
	COMMON		
	TOTAL	440,600.000	

STOCK NO.	DATE	NUMBER OF STOCKS	HOW SOLD	PRICE
78845	5/15/51	816.00		20.18
78846	5/15/51	20.18		23.00
78847	5/15/51	20.18		23.00
78848	5/15/51	20.18		23.00
78849	5/15/51	20.18		23.00
78850	5/15/51	20.18		23.00
78851	5/15/51	20.18		23.00
78852	5/15/51	20.18		23.00
78853	5/15/51	20.18		23.00
78854	5/15/51	20.18		23.00
78855	5/15/51	20.18		23.00
78856	5/15/51	20.18		23.00
78857	5/15/51	20.18		23.00
78858	5/15/51	20.18		23.00
78859	5/15/51	20.18		23.00
78860	5/15/51	20.18		23.00
78861	5/15/51	20.18		23.00
78862	5/15/51	20.18		23.00
78863	5/15/51	20.18		23.00
78864	5/15/51	20.18		23.00
78865	5/15/51	20.18		23.00
78866	5/15/51	20.18		23.00
78867	5/15/51	20.18		23.00
78868	5/15/51	20.18		23.00
78869	5/15/51	20.18		23.00
78870	5/15/51	20.18		23.00
78871	5/15/51	20.18		23.00
78872	5/15/51	20.18		23.00
78873	5/15/51	20.18		23.00
78874	5/15/51	20.18		23.00
78875	5/15/51	20.18		23.00
78876	5/15/51	20.18		23.00
78877	5/15/51	20.18		23.00
78878	5/15/51	20.18		23.00
78879	5/15/51	20.18		23.00
78880	5/15/51	20.18		23.00
78881	5/15/51	20.18		23.00
78882	5/15/51	20.18		23.00
78883	5/15/51	20.18		23.00
78884	5/15/51	20.18		23.00
78885	5/15/51	20.18		23.00
78886	5/15/51	20.18		23.00
78887	5/15/51	20.18		23.00
78888	5/15/51	20.18		23.00
78889	5/15/51	20.18		23.00
78890	5/15/51	20.18		23.00
78891	5/15/51	20.18		23.00
78892	5/15/51	20.18		23.00
78893	5/15/51	20.18		23.00
78894	5/15/51	20.18		23.00
78895	5/15/51	20.18		23.00
78896	5/15/51	20.18		23.00
78897	5/15/51	20.18		23.00
78898	5/15/51	20.18		23.00
78899	5/15/51	20.18		23.00
78900	5/15/51	20.18		23.00

## Analysis of Subscriptions

Name of Company	PACIFIC GAS AND ELECTRIC CO
Class of Security Offered	6% Preferred Stock
Par Value of Stock Sold	\$5,000,000
Duration of Campaign	7,062,626
Number of Subscriptions Received	8,773
Average Subscription	13 1/4 Shares
Selling Expense Per Share Paid by Buyer	22 1/2 cents
Selling Price of Stock	\$97 and 1/8 per share

CLASSIFICATION AS BETWEEN FULLY AND PARTLY AND SUBSCRIPTIONS				
No of Subscriptions	Shillings	No of Percent	Subscription (dang)	
Partly Paid	2213	59.144	37.102	14.464
Partly	3110	80.856	12.898	24.605
Total	5323	100.000	50.000	39.069

SPLITTING OF NEW AND OLD STOCKHOLDERS		
No. of Subscriptions	% of Total	Cost per Share
928	16.81%	\$17.21
5,528	83.19%	939
243	4.34%	212
Total	79,932	\$22.39
and Common	11,078	100.00%
Total	3,123	

CLASSIFICATION	DISTRIBUTION
Existing Stockholders	Advertising
Preferred	Control of Stock Sales
Common	Stationery and Misc.
Both Preferred	
New stockholders	

### Typical Advertisements

Ball number of insertions, large ad	27
Ball number of insertions, small	59
Number of local newspapers utilized	19
Average number of insertions each paper	4.5

**Pacific Gas and Electric Company**

245 Market St  
San Francisco, California

San Francisco, California

Exhibit prepared by Pacific Gas and Electric Company for the National Electric Light Association upon a recent customer-ownership stock sale campaign. Interesting figures as to distribution of stockholders, as to holdings of stock, vocations and other classifications are detailed. This campaign established a record-selling cost of but 22 cents per share.

Of the 3,723 subscriptions, 2,826, or 75.58 per cent were for 10 shares or less. The average subscription was for 13.4 shares.

Of the 50,000 shares purchased by the customers of the company, 75.4 per cent were paid in full, and 24.6 per cent were purchased on the installment plan.

Women bought 11,745 shares, or 23.49 per cent of the total, while 10,132, or 20.27 per cent were bought by "joint tenants," usually husband and wife.

Old stockholders made 1,077 subscriptions, or 28.93 per cent of the total. New subscribers for stock, however, amounted to 2,646, or 71.07 per cent of the total. The latter group were composed of people who had never before owned stock in the company.

The following tables show in further detail some of the unusual features of the stock holdings and classifications of stockholders. The first table gives in detail the number of stockholders listed according to the size of holdings:

Distribution According to Size of Holdings

Stockholders owning or subscribing for: share	Number of holders	Per cent of total	Accumulative No. of holders	Totals Per cent of total
1	357	9.54	357	9.54
2	361	9.66	718	19.20
3	200	5.35	918	24.55
4	119	3.18	1,037	27.73
5	742	19.85	1,779	47.58
6 — 10	1,047	28.00	2,826	75.58
11 — 25	532	14.23	3,358	89.81
26 — 50	262	7.01	3,620	96.82
51 — 100	94	2.51	3,714	99.33
101 — 200	18	.48	3,732	99.81
201 — 500	4	.11	3,736	99.92
501 — 1,000	3	.08	3,739	100.00
Total	3,739	100.00		
Subscriptions cancelled	16			
	3,723			

In regard to payment for stock subscriptions the following interesting figures have been given.

Classification as Between Fully Paid and Partly Paid Subscriptions

	No. of subscriptions	Per cent	No. of shares	Per cent	Average subscriptions (shares)
Fully paid	2,213	59.44	37,702	75.40	17.0
Partly paid	1,510	40.56	12,298	24.60	8.1
Total	3,723	100.00	50,000	100.00	13.4

Distribution of stock as to the sex of the stockholders gives the following data:

Classification as Between Men, Women, Etc.

	No. of subscriptions	Per cent	No. of shares	Per cent	Average subscriptions (shares)
Men	1,762	47.32	24,752	49.50	14.0
Women	1,243	33.39	11,745	23.49	9.5
Joint Tenants	691	18.56	10,132	20.27	14.7
Corporations, Associations, etc.	27	.73	3,371	6.74	124.9
Total	3,723	100.00	50,000	100.00	13.4

The large percentage of new subscribers for stock as compared to old stockholders subscribing is shown below:

Classification as Between New and Old Stockholders

	Number of subscriptions	Per cent of total
Existing Stockholders:		
Preferred	628	16.87
Common	206	5.53
Both Preferred and Common	243	6.53
Total	1,077	28.93
New Stockholders	2,646	71.07
Total	3,723	100.00

The cost of selling the stock is given in the following table:

Distribution of Selling Cost

	Amount	Cost per share
Advertising	\$8,606.84	\$ .1721
Payroll of Stock Sales Dept.	1,952.75	.0391
Stationery and Miscellaneous	637.27	.0127
Total	\$11,196.86	\$ .2239

An additional list, giving the number of stockholders listed by vocations in which they are engaged, provided an interesting feature of the large display of the figures concerning the campaign prepared as an exhibit for the National Electric Light Association. In it reports as to the vocation of 2,682 of a total of 3,723 stockholders were listed, together with the number of subscriptions from each vocation and the amount of shares represented by those subscriptions.

In that list one of the unique features was presented in the number of housewives subscribing. Next to clerical workers, representing 456 subscriptions, the housewives were the most numerous of the stockholders. There were 392 housewives' subscriptions, representing 4,149 shares of stock. Mechanics and building tradesmen came next, with 205 subscriptions and 1,806 shares of stock. Others leading in subscriptions and share ownership were managers, foremen and superintendents, merchants and business men, retired salesmen, professors and teachers, laborers, engineers and city, county, state and U.S. officials.

Nothing extraordinary was prepared in the way of advertising for the campaign. Only two advertisements were used, one large and another small, as may be seen in the display. The large advertisement was inserted but 27 times and the small one 58 times. The number of newspapers utilized was only 19, with an average of 4.5 insertions for each paper. It will be seen from this that printed salesmanship was no more required than actual salesmanship, and that the stock issue practically sold itself on popular demand.

The exhibit prepared by Mr. Hockenbeamer for the N.E.L.A. was mounted upon a panel 6 x 4 ft. in size. A frame of California redwood surrounded the lists and charts prepared. A photograph of the exhibit may be seen reproduced upon another page. By means of the exhibit the salient features of the campaign were admirably summarized and presented. The charts told the story almost at a glance.



# Making Good Friends and Better Customers of the Farmers

By George C. Sawyer

Sales Manager, Pacific Power & Light Company, Portland

THE question of how best to establish and maintain a relationship with rural customers as close and as satisfactory as that existing with urban customers always has been more or less of a perplexing problem with the Pacific Power & Light Company. Serving, as it does, a large number of farms, farmers' tenant houses, and small rural groups scattered around each of the towns and cities served in Oregon, Washington and Idaho, the company always has felt that it suffered somewhat from that lack of understanding of its problems that comes from an absence of close acquaintanceship between the company personnel and the farmer customers.

## Public Relations and Commercial Aspects

The management has been alive to this problem and has studied the situation intensively, with a sympathetic understanding of the farmer's point of view. This study revealed that in some quarters unfavorable conditions existed that might not have prevailed had the company been able to effect a mutual understanding with a large number of its rural customers, while in other quarters it revealed that a fertile field existed in which might be sown the seeds of agitation for radical legislation affecting utilities. A number of the usual and some unusual media had been employed in an attempt to bring about this understanding, and a reasonable degree of success had been attained, but it still was felt that further intensive cultivation of the farmer's interests would result in mutual advantage both to the company and the customer. One of the underlying thoughts in this connection was that a hidden enemy is more dangerous than an open one and that if the enemies could be sought out they could be either conciliated or guarded against. Thus it was determined to put into operation a sort of personal rural electric service, in which a man with a broad understanding of the utility business and thoroughly trained in the policies of the company would make friendly contact with all the rural customers and maintain this contact by frequent visits.

Logically coupled with the public-relations aspect of this service, is, of course, the commercial aspect. Although all campaign advertising in the country press and all direct-by-mail literature reaches all

***R**EAIZING that the farmers represent a particular class needing specialized treatment in the problem of customer relations, the Pacific Power & Light Company has instituted an unique service. It is explained in this article by the man that fathered the idea and put it into operation.*

customers, nevertheless it was felt that sales did not attain sufficient volume among rural customers. Two main reasons for this are, perhaps, that it is difficult to solicit personally the scattered customers in the country, some of whom live twenty miles from the nearest company office, and that many such customers pay their bills by check

and so have little occasion to visit company stores. The success of certain retail businesses that have tried carrying their goods to the customer by peddling along the roads led to the belief that this principle could be applied in a dignified way and included in the prime duties of the rural electric service man. Even though no great volume of appliance sales might result, it was seen that this function would furnish the entré for the service man to engage the customer in conversation which perhaps might unearth and clear up other and more weighty matters. Thus the service man carries with him a reasonably complete line of small appliances, repair parts, extra cords, plugs of various types, and lamps of all sizes, as well as a washing machine and a vacuum cleaner.

## Transportation Equipment

The first detail to be worked out in putting the service into effect was the matter of transportation equipment. After some investigation a one-ton, panel-body truck was purchased and fitted up for carrying and displaying appliances. Special doors were cut in the side of the body, and, inside, a show case with shelves and back was built. Angle-iron uprights extending from the floor to the ceiling carry wire shelves similar to the shelves used in refrigerators. Small appliances are fastened securely on to these shelves by means of wire hooks secured by turning up thumb nuts against large washers on the underside of the shelf. The advantage of this type of shelving over wooden shelving is that the wire mesh does not accumulate dust and is easy to keep clean and neat. Furthermore it permits of changing the appliance display with a minimum of effort since the flexibility of the wire-hook fasteners is readily adaptable to appliances having bases of different shapes and sizes.

The background of the display case is of building board, attached to the angle-iron uprights. This is painted gray with a high gloss finish so that it

is easily dusted and kept clean. The side doors opening onto the display are designed to fold and slide in one direction only, swinging flat against one side of the opening, leaving only one-half of the outside of the door exposed to view. Thus the attractive setting of the display is unimpaired by any unfinished woodwork around the opening. Only the forward half of the body is utilized by the small appliance display, leaving the rear half, reached by rear doors, for a washing machine and vacuum cleaner or other larger device.

### Duties of the Service Man

The service man's basic duty is to call periodically on all the rural customers in his district. He then must be prepared to discuss any subject pertaining either to company relations with the customer or to the utility business in general, whether it be concerning last month's bill or government ownership. He must of course be on the lookout to sell an appliance, or repair one that has gone out of service, or fill the empty lamp sockets, or give advice on wiring and on the application of motors to the farmer's needs for irrigation, stationary spraying and the like. In short, he is an all-around handy man in things electrical with a two-fold purpose. First, with a sympathetic understanding of farm problems, he takes the company's personal service to customers residing some distance from the ordinary center of company activities; secondly, he reaches a class of customers requiring specialized treatment, explaining some of the fundamental

principles of the utility business in general and some of the necessary policies and practices of their own utility company in particular.

If the customer is interested in the larger matters discussed, he is given literature from the supply carried as part of the truck equipment. Such literature consists of the General Electric Farm Book, "Electricity in Oregon Agriculture," issued by the Oregon Committee on the Relation of Electricity to Agriculture, and available booklets on farm uses of electricity published by the experiment station of the state agricultural college. Other literature will be added to this list from time to time, and when an inimical political issue is before the people, such as was the Bone Bill in the state of Washington in 1924, the rural service man will prove to be an effective medium through which to present the utilities' side of the question to a scattered electorate difficult to reach by other means.

An important duty of the rural service man is to investigate and work up rural extensions. The man employed is thoroughly versed in the extension rules of the company and the state commissions, and is enough of an engineer to survey and lay out any extension to connect a group of prospective customers. He is capable of soliciting the prospective territory in an intensive way to secure as large an annual revenue as possible, and, after comparing the estimated revenue with the estimated cost, he is capable of explaining the necessity of customers' participation in the way of advanced revenue, if any. Thus his contact with such



AN emissary bringing good will and service is this rural electric service truck of the Pacific Power & Light Company of Portland. The rural service truck makes a regular round of all customers on the rural lines of the company every so often to repair minor troubles experienced with appliances, service trouble, and extend friendly relationships. It carries a full stock of small appliances for sale to customers, ingeniously displayed as shown in the first picture. In the second picture may be seen the manner in which the major appliances are carried. The lower photograph shows the outfit with its trouble-man salesman and good-will builder ready to start.

customers begins while they are still in the prospect class, and it is hoped that his handling of such situations will inspire such confidence among the customers that they will turn to him in every matter that comes up later affecting their relationship with the company.

### Customers Are Classified

One of the important phases of the work is the card record kept of all calls made. The customer's interest in any appliance or electrically driven farm machinery is noted on these cards for use later as prospect lists to be followed up at the proper time. In addition to the appliance record, a notation is made as to the acreage farmed, character of the crops, the apparent relative prosperity of the farmer, and whether he owns or rents the farm. By means of a key system his attitude toward the company, whether friendly or otherwise, and his opinion on political ownership are catalogued. A tremendous amount of information is gained in this way that will be helpful in circularizing appliance and stock prospects, and in keeping track of customers whose attitude toward the company is favorable.

Close co-operation exists between this rural service and the county farm agents, state experiment stations and state committees on electricity and agriculture. The service man informs himself of what these agencies are doing, and in turn advises the farmer and assists him to secure the information he desires. The service man usually has found the local representatives of these agencies to be in sympathy with his work and ready to co-operate.

### Immediate Returns Realized

After a few months' trial, results indicate that this rural service is making headway in bringing about a better understanding between the company and its farmer customers. In several instances misunderstandings have been cleared up, with the result that revenue has been added and a friend has been made of an enemy. Specifically, in one instance, the service man ran across a farmer who, due to a misunderstanding with the company some

time prior, had discontinued using a 5-hp. motor and otherwise had curtailed his use of electric service. After hearing the customer's side of the case and explaining the company's in a frank discussion, the service man was able to take a new application for the discontinued power service to the complete satisfaction of the customer. Many minor difficulties over bills and whatnot have been explained or adjusted, and matters which otherwise never might have come to the attention of the company office because, perhaps, they were thought to be too trivial, have been arranged to the satisfaction of the customer, thereby keeping an ingrowing "grouch" from developing possibly into out and out antagonism.

Another favorable result of the service has been in the new rural business added through extensions. Several new customers have been connected on a basis satisfactory to the company. A number of these extensions were not live issues at the time the rural service man commenced his duties, and, since they were not being pressed by the prospects, it might have been a long time before they ever would have come to the attention of the office in the ordinary course of events. Thus during that time the company would not have had the revenue, and, what is perhaps more important, the farmers would not have had electric service.

The personal rural service first was put in operation in The Dalles-Hood River, Ore., district of the company. A second man with identical equipment, now has been established in the Yakima Valley, Wash., territory, and a third will be put into the Walla Walla, Wash., district as soon as the right man becomes available. This will cover the principal districts served by the company wherein are located most of the rural customers.

To sum up, the company felt that particular attention should be given to its farmer customers, and this personal rural electric service was the outgrowth of that feeling. The company is satisfied with results thus far attained and believes the returns will be cumulative.

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## Water Power and Steam Power in California Utilities

By H. A. Barre\*

Executive Engineer, Southern California Edison Company, Los Angeles

THERE always has been more attendant publicity in connection with the development of water power than there has with the development of steam power. This widespread publicity, coupled with the existence of low rates and the almost universal use of electric service in California, apparently has given rise to the impression that

water power has been the cause of these desirable results.

A brief analysis of the power situation to determine more clearly the respective contributions of water power and steam power to the existing conditions of the industry and their probable future effects may be of interest.

There can be no question that if no water power ever had been developed in the state there would

\* Paper before Spring Meeting, American Society of Mechanical Engineers, San Francisco, June 28-July 1, 1926.

have been just as many kilowatt-hours sold annually as there are today. The use of electric power does not depend upon production but on market and distribution. Experiencing its most rapid development during a period when the advantages of electric-power supply from central stations had become well known, California supplied the market. Enterprising managements of electric utilities, recognizing the condition and aided by the rapid progress in the art of distribution, built the electric systems and by aggressive solicitation of business developed the market for practically a universal use of central-station electric power. That some part of the power supply came from water-power sources was incidental to the controlling factors of market existence and the presence of enterprising men willing to furnish the market with an electric-power supply.

Probably the most important contribution of water power to the industry is the fortunate fact that practically all the water powers are located at a distance from centers of utilization and that it was necessary to develop the art of transmission at higher and higher voltages to deliver the power to the towns. Shortly after the earlier of these water-power plants began to transmit electric energy to the towns, uses for power rapidly sprung up along the line in the outside country, and the amount of energy received by the towns from original sources of production began to decrease until the condition arose that at the season when water power was abundant some power was delivered to the towns, while during the season of low flow of the streams power generated from other sources flowed back from the larger cities to the country and the smaller towns.

The fluctuating character of the California streams also played a part in broadening the use of electric power, particularly in rural districts. Available water power occurs at its maximum during the rainy season and the early summer when the streams are filled from melting snow. In the late summer and fall low stream flows reduce the water-power supply. The heavy lighting loads occur during the early winter, usually before the streams begin to rise. Surplus water power in the early spring and summer, as well as the steam resources held for the winter peaks, made it possible to serve a summer irrigation-pumping load by the extension of the distribution system and with a minimum of generating plant.

The extension of country lines to serve irrigation-pump motors made possible further service of lighting and other domestic and industrial applications in outlying sections and still further broadened the field of use of electricity.

It is conceivable that with the improvements that have been made in the art of steam generation during the past fifteen years and with the comparatively low prices of fuel oil that have accompanied the development of the California oil fields in the same years, the cost of electric power in the cities perhaps could have been made as low as if served from the present systems of co-ordinated water powers and steam plants, but the extension

of service to smaller communities and rural districts probably would have been slower in reaching its present density. In this connection it is interesting to note that those few companies in California which operate solely on steam power sell service at practically the same rates as those having water power, and have as high financial standing.

California water powers arrange themselves into two classes:

1. Those utilizing water storage during the dry season by means of either natural or artificial reservoirs.
2. Those using the unregulated natural flow of the streams.

The latter must be considered mainly as auxiliaries to a steam plant, since as a whole a steam installation of at least 75 per cent of their installed capacities is required to produce primary commercial power.

The former require small steam reserves and permit of highly efficient steam operation, since water deficiencies may be made up in kilowatt-hours by 24-hour operation of steam plants, while reservoir plants are available to carry peaks up to any predetermined draft on stored water.

Obviously, then, co-ordinated systems of steam and water power are needed for the maximum use of water resources. It is also apparent that a 100 per cent water-power supply is not desirable since this would mean that water powers would be developed for only the minimum flow of the stream and all the kilowatt-hours in the water in excess of the minimum would not be developed. In California, and in fact all over the world except in very few exceptional cases, the amount of such a minimum power is so small that it would not form a satisfactory supply for commercial power systems.

This condition of stream fluctuation emphasizes the futility of statements that are frequently made by economists, congressmen, chambers of commerce, and others that a certain territory has a potential resource of a certain number of horsepower of water power. Without the qualifying knowledge of the amount of co-ordinating steam needed, such a statement is worthless as a measure of the value of the territory as a power producer. The whole economic situation from a power viewpoint must involve flow characteristics, cost of fuel, economy of steam plants, and cost of plants of both kinds.


The high economies that have been obtained in the recently completed steam plant of the Los Angeles Gas and Electric Corporation at Seal Beach, and the Southern California Edison Company at Long Beach, have made a decided difference in the situation. While the older steam plants in California have economies of 200 to 260 kw-hr. per barrel of oil under full-load conditions, the economy of these new plants is of the magnitude of 425 to 450 kw-hr. per barrel. At such efficiencies the fuel cost with oil at \$1 per barrel ranges from 2¼ mills per kw-hr., a figure so low that additional stream-flow plants in California are practically out of the question, and plants having storage facilities must be scrutinized more carefully than heretofore. Only an increase of several hundred per cent in the price of fuel can change this condition.



## Where the Radio Dealers Do Play Ball

A SHORT time ago an editorial appeared in the columns of the Journal of Electricity urging that radio dealers refrain from blaming interference on the power company and take steps to make their customers understand the multiplicity of causes to which their trouble may be due.

It perhaps will be of interest to Journal readers to know of the work already being done toward this end in the district covered by the Pacific Radio Trade Association. This organization, with headquarters in San Francisco, is a co-operative body made up of representatives from all branches of



PACIFIC RADIO TRADE ASSOCIATION  
INTERFERENCE DATA BLANK

From ..... (Name) ..... (Phone) .....

..... (Address) .....

Type and make of set.....

Kind of interference: Hum (.....), Hiss (.....), Roar (.....), Squeal (.....), Tap (.....), Buzz (.....), Crash (.....), Surge (.....).

Time that interference occurs ..... a.m. .... p.m. .... Day.

Does it cover entire dial? (.....) or near what stations on dial (.....)

Is it continuous? (.....) or intermittent? (.....). When first noticed? (.....)

Does it continue when you pull the main service switch supplying your home with light and power? (.....) or when your neighbors pull their switches? (.....)

Has anyone who understands radio sets and circuits examined your batteries and your set? (.....). If so, to what did he assign trouble? (.....)

Do you, or does anyone in your neighborhood operate oil-burning furnaces, elevators, small motors, violet ray or X-Ray machines, or other electro-mechanical appliances? (.....) Ever turn them off to see if they might be causing the trouble? (.....)

State type of batteries (A, B, and C) used, and B Eliminator if no batteries. (.....)

Aerial height..... Length..... Parallel to other wires?.....

Where is ground connection made?..... Is lead-in a separate wire? (.....). Is it soldered? (.....). Is aerial insulated from trees and other grounded material? (.....). Is it fastened at either end to lighting or telephone poles? (.....). How many blocks from the nearest street car line? (.....)

With aerial and ground wires disconnected and their binding posts connected with a wire, do you still get the interference? (.....)

What other listeners in your vicinity are having the same trouble? .....

.....

What is the best time of day to call?.....

These questions should be answered by the person bothered by the interference and this sheet then returned to the Dealer from whom it was obtained. His service man can determine whether the trouble is within the set or whether it comes from an outside source. In the latter case, he should refer it to the local radio club, or power company for investigation. Should they be unable or unwilling to locate the noise source, this report, as a last resort, may be forwarded to the U. S. Supervisor of Radio, Custom House, San Francisco, for such action as he deems necessary.

Furnished by..... (Dealers' Name) .....

By means of this information blank, used by the Pacific Radio Trade Association in receiving radio complaints, the dealer is able to trace definitely the source of trouble and, co-operating with the power company when necessary, assist in having it cleared.

the radio trade. It is the sponsor of the annual radio show held in San Francisco and furthers all measures for the betterment of the radio industry on the Pacific Coast. Recently the association has issued an interference data blank for the use of radio retailers who come up against the situation dealt with in the Journal of Electricity editorial.

In place of blaming the trouble on the power company, the radio dealer hands the customer complaining of interference one of these blanks from

the pad kept always on his counter. The questions asked call for information as to names, address, type and make of set, and nature of interference. In addition, the complainant is asked to specify whether the interference covers the entire dial, at what hour it occurs, whether it is continuous or intermittent, and when it first was noticed.

Details are asked as to the set, whether batteries or eliminators used, the aerial height and construction, whether soldered, insulated from trees and other grounded objects, fastened at either end to telegraph poles, near a street car line, and the like. In addition, the owner is asked if he has had his set examined by anyone who understands radio, whether he has experimented to see if the interference continues when the main switch governing the power in his home is pulled, or when that in the homes of his neighbors is pulled. He is asked if he possesses, or if there are in the neighborhood, elevators, oil-burning furnaces, small motors, violet or X-Ray machines or other electro-mechanical appliances, and whether he has experimented to see if the trouble continues when these are not operating.

If at the conclusion of his examination, or that of the expert he calls in, the trouble still seems to fall at the door of the power company, the blank with all its attendant information is forwarded to the power company in question which is, as a rule, very glad to follow up the difficulty. As may well be imagined, however, the set usually is repaired by that time, the aerial moved, or the violet-ray machine shut off. The power company is saved considerable expense of examining difficulties not properly laid at its door—and the set owner is saved a feeling of grievance against the central station. This is one form of playing ball on the part of the radio dealer that is greatly appreciated by all concerned.

## Oregon Public Ownership Bills Fail

NEITHER of the initiative measures designed to place the state of Oregon in the business of electric power generation and distribution, namely the so-called "Housewives bill" or the Grange bill, received enough signatures to qualify for a place upon the ballot this year, according to late advice from Oregon. The "Housewives" measure received over 13,000 signatures, but was barred by the Attorney General who declared that it would require in excess of 14,000 signatures, based upon the percentage of votes cast for supreme justice at the last election. It is understood that the promoters of the "Housewives" measure will take the matter into court in an attempt to have the measure placed on the ballot.

The Grange bill, which was being submitted by the Oregon State Grange, was withdrawn before the date set for filing of petitions, on account of lack of signatures. A third measure initiated by the Oregon State Grange, the Public Ownership League of Oregon, and the Hydro-electric League of Oregon, was also abandoned.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Record System Is Aid to Locomotive Maintenance

### Careful Check on Storage-Battery Locomotive Operation Facilitates Thorough Equipment Maintenance

By HECTOR KEESLING, Assistant Engineer, General Construction Department,  
Pacific Gas and Electric Company, San Francisco

Storage-battery locomotives were very important factors in the construction of the Pit 3 tunnel. All of the hauling in conjunction with the driving of the tunnels and their concreting was done by these locomotives, of which there were 10 on the job.

Of these locomotives 8 were purchased new for this job, each complete with battery. Five extra batteries were purchased and distributed among the charging stations so that the locomotives at all times were able to change a discharged battery for one which was charged. The locomotives were G. E. type LSB-2-C 6-ton (nominal), each equipped with 88 cells of Exide MV-17 iron-clad batteries grouped 8 cells per tray and mounted in 2 steel compartments. Six trays were installed in one compartment and 5 trays in the other. Rated discharge capacity of the battery was 45.5 amp. for 6 hr., equivalent to 47.5 kw.-hr. They charged at 45 amp. normal rate and at 18 amp. for the finishing rate, voltage 170 average.

The locomotives were provided with steel-tired wheels. Chassis weights were 10,000 lb. batteries and compartments 5,900 lb., making the total weight 15,900 lb. They had a nominal rating of 2,400 lb. draw-bar pull on level track at a speed of  $3\frac{1}{2}$  mi. per hr. Principal dimensions of these locomotives were as follows: track

in., wheel base 54 in., overall width 61 in., wheel diameter 20 in., maximum height above rail 45 in.

The other 2 locomotives used were Baldwin-Westinghouse class 4-2-10-C226. These locomotives are old-timers, having been shipped from the East Pittsburgh Works of the Westing-

house Electric & Manufacturing Company Dec. 21, 1908. They were built as trolley-type locomotives with 24-in. diameter wheels and a gage of 24-in. The chassis weighs 4 tons. They saw service on the Los Angeles Aqueduct where they operated as trolley-type, and on some preliminary work done by this company on the Big Bend project on the Pit River. The trolleys were abandoned at that job and a battery arranged on top of the chassis. For the Pit 3 job the gage was widened to 36 in. and a larger battery provided. This battery consisted of 88 cells Exide MV-15 iron-clad batteries assembled in 11 8-cell trays and mounted in a single steel container box. The battery and box weigh approximately 5,000 lb.

Considerable trouble was encountered with axles breaking because of the large additional weight of batteries loaded on top of the chassis, resulting in a high center of gravity which was particularly severe on the axles, since the gage had been widened. Special axles of heat-treated steel did not eliminate this trouble. If these locomotives are to be used in future jobs the size of the axles probably will be increased. The wiring of the locomotives for the new battery installation was revamped by company forces. The mechanical changes on the locomotive were made at the shops of the Pacific Car and Equipment Company, South San Francisco, who also made the steel battery containers. Other than the axle breakage the performance of the locomotives was good.

Throughout the tunnel 50-lb. rail was used and gave a comparatively good construction track which safely permitted considerable speed. The

G. E. locomotives hauled two 6-cu. yd. cars loaded with excavated material up a grade of 3 ft. per 1,000 ft. at a speed of approximately 6.6 mi. per hr. With two empty cars, returning to the heading on a downhill run of the same grade, the locomotives traveled at about 8.6 mi. per hr. The speed, hauling concrete cars, was about the same as the above with 2-car trains, each car having a capacity of  $2\frac{1}{2}$  cu. yd. of mixed concrete.

The Westinghouse locomotives handled the same number of cars of muck at about the same speed, but the loaded cars were hauled down grade and the empties up grade. These locomotives were not used on the tunnel concreting work because they were kept busy hauling excavated material from the surge chamber. This latter material was trapped into cars in the surge chamber tunnel, a tap tunnel from the main tunnel line.

Installations necessary to the driving and concreting of the tunnel, such as blacksmith shop, timber framing shed, ventilating machinery, etc., were set up at each point from which the tunnel was portaled. Such installations included battery charging plants and were 4 in number; at Intake, Rock Creek, Adit and Lower Portal. Two G. E. locomotives were used at Intake, four at Rock Creek and two at Adit. The two Westinghouse locomotives were used at the lower portal. A 15-kw. charging set was installed at each of these places, but later on it was found advisable to augment the Rock Creek charging plant with an additional motor-generator set of 25-kw. capacity. This was necessary on account of the long hauls in the headings at this place.

Details of one of the charging stations are shown in Fig. 1. In addition to the power and light services these stations were piped for air and water. A pit beneath the track permitted inspection of the locomotives from underneath. For the sake of convenience, in the future charging stations, the motor-generator sets and switchboard will be located on the same side of the building as the storage and tool room to avoid having to climb over the batteries and supporting structure when going back and forth from the charging set to the shop or tool room.

To change batteries the locomotives were run into the charging station and the batteries to be charged were hoisted from the locomotive and landed on timbers bridged over the track. The locomotive then was moved to a position directly beneath a charged battery which was lowered onto the chassis. Each section of batteries was handled by

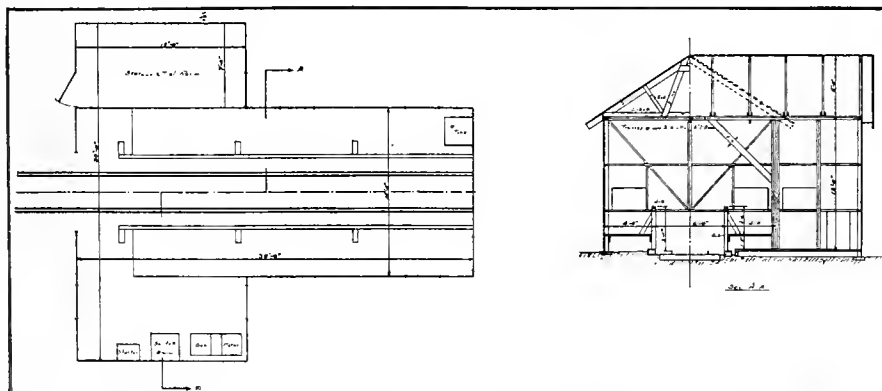


Fig. 1. Plan and section of battery-charging station on Pit 3 project.

means of a 2-ton chain-block with trolley running overhead on a 6-in. I-beam the full length of the locomotive track inside of the building. Chains with hooks which engaged in slots in the sides of the steel battery containers were used with the chain blocks. Ordinarily 4 men were used to make a battery change; 2 laborers called in from adjacent work, the motorman, and the attendant of the charging operations. The lift was approximately 3 ft. and the change took about 20 min. It was necessary to break the battery connections between the two sections before moving the sections and to make up the connections again when hooking up for charge or after setting the batteries back on the locomotives. Some argument was advanced toward installing a power lifting device capable of lifting both sections of the battery at once. Speed was essential in the battery change to keep the headings supplied with cars. The power lift will be considered on the next installation with a view to cutting down manual labor. Also it will eliminate the risk of short-circuiting the battery through the loose ends of the battery connections between sections.

One maintenance man was stationed at each of the charging stations. He looked after the ordinary charging of the batteries, the weekly equalizing charge, and the monthly overcharge. When the batteries were on the charging rack they were washed off with water and blown with air to dry off the water. This move kept the cells in good external condition, reducing

any chance for sneak currents, and kept electrolyte from getting on the trays and on the locomotive. During the time the batteries were being changed the maintenance man inspected and oiled the locomotive. The controllers were inspected each day and minor repairs made to them as needed. Headlights were cleaned and replaced and small repair jobs done. In addition to the duties above mentioned this man replaced broken and burned out lamps in the tunnel sections near his station.

### Reports

A full daily log covering all of the charging stations was made out by an electrical foreman whose particular province this was. A series of typical reports follows:

#### DAILY REPORT

April 5, 1925

Portal 1 (Diverson)

Oiled motors on locomotive No. 9459 to prevent concrete from sticking on frames.

Portal 2 and 3 (Rock Creek)

Repaired cell No. 4 in battery No. 7854 and found a piece of lead wedged between 2 cylinders of the + plate and the separator punctured causing a short from + to - plates.

Portal 6.

O.K.

#### DAILY REPORT

April 13, 1925

Portal 1

O.K.

Portal 2 and 3.

Fingers arcing in controller on locomotive No. 9460 repaired and put in service.

O.K. Repaired lights and fuse on locomotive No. 9460. Cleaned commutator and adjusted brushes on locomotive No. 9457. Oiled locomotive No. 9461 to prevent concrete from sticking.

Portal 6.

Put new bearing in motor No. 2 of locomotive No. 3425.

#### DAILY REPORT

April 21, 1925

Portal 1.

O.K.

Portal 2 and 3.

Headlight reflector broken on locomotive No. 9460, replaced by new one. Replaced fuse on battery No. 7853, which was blown.

Cell No. 66 on battery No. 7834 broken beyond repair—caused by rock blasted from quarry. Put jumpers around cell until new one was received.

Portal 6.

O.K.

#### DAILY REPORT

April 22, 1925

Portal 1.

O.K.

Portal 2 and 3

Put new terminal on cable battery No. 7861.

Armature taken out of motor generator sets No. 2 and No. 3 15 kw. and commutators turned down.

Portal 6.

O.K.

#### MONTHLY OPERATION—TO BE FILLED IN BY OPERATOR

Gravity Reading of Each Cell Upon Completion of Equalizing Charge

Cell Gravity	Cell Gravity
1.....1.280	2.....1.282
3.....1.280	(data kept on each cell in each battery)
87.....1.281	88.....1.281

#### PIT 3 DEVELOPMENT

#### BATTERY OPERATION REPORT FOR MONTH OF SEPTEMBER, 1924

Battery No.— 12796  
Location— Camp 9 (Adi  
Operator— Bund

Daily Report to be Filled in by Operator  
Amp.-Hr. Meter Readings

Date On	Off	Date On	Off
Chge.	Chge.	Chge.	Chge.
1.....X.....X	16.....170.....0		
2.....150.....0	17.....X.....X		
3.....190.....0	18.....200.....X		
4.....X.....X	19.....X.....X		
5.....X.....X	20.....X.....0		
6.....X.....X	21.....200.....0		

Etc., Etc.

X denotes that battery was out on locomotive or was on charge on that date.

#### Weekly Operation Report to be Filled in by Inspector

Watered—	9/2	9/13	9/23
Cleaned—	9/2	9/13	9/23
Equalizing Chg.	9/4	9/14	9/24
Gravity of Pilot Cell when Charge Completed	1282	1300	1285

These reports were turned in to one of the electricians who acted as a battery inspector, in conjunction with his other duties. He assisted in pulling cells for repairs and compiled the operation reports. The daily log showed the routine work done and detailed the repairs made to locomotives and batteries. The nature of troubles found in faulty cells, detected by the monthly gravity readings, also showed in the daily log. The space for daily report data showed the number of cycles of charge and discharge the battery was given per month and prevented the motormen from discharging the battery to too low a point. Under the weekly operations the dates of watering, cleaning and of the equalizing changes were recorded. The space on this sheet for monthly operating data was not used but the gravity of each cell after the monthly overcharge had been given was recorded on another sheet.

Curves plotted from these gravity readings, a typical section of which is shown in Fig. 2, showed at a glance the condition of each cell. The defective cells could be picked out readily on account of the low gravity and special attention given them. Causes of abnormal drop in specific gravity of the electrolyte were found to be mainly broken separators and shorts caused by pieces of lead left in by the factory in assembly.

During the 1½ years the batteries were in use about 6 jars were broken, due mainly to collisions. One cell was damaged beyond repair by a flying rock from a quarry blast.

Some trouble developed with the amp.-hr. meters due to sweating and subsequent rusting. This sweating was caused by the difference in tem-

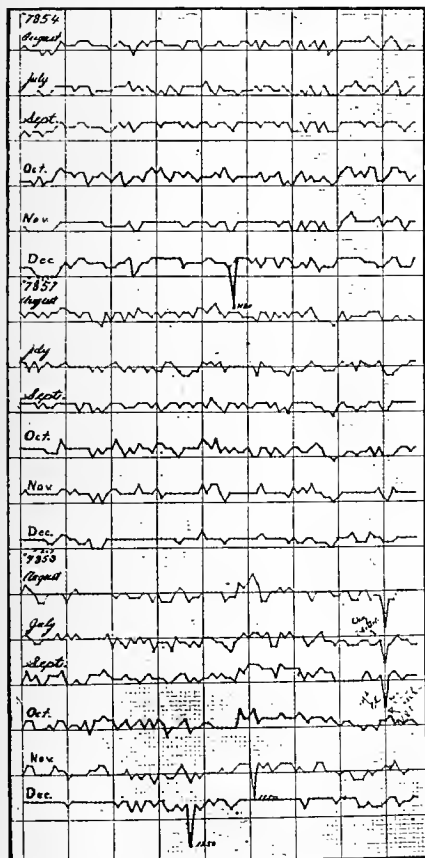


Fig. 2. Typical section of chart showing monthly plottings of every cell in a battery group, in this case battery No. 7854. It may be noted that all weak cells show up at once and that necessary attention may be given at once.

A monthly operation summary also assisted the keeping of a full check on battery conditions. A typical example follows:

perature inside and outside the tunnel which caused moisture to condense on the inside of the meter case, due to the internal heat in the meter. To overcome this the meter was enclosed in a sheet metal house in which incandescent lamps were burned. It is thought that some sort of a cushion support such as the spring support used on the G. E. headlights should be used for supporting these meters to lessen the jar on them.

Following are some comments on the equipment including recommendations of changes which it is thought will better the installations:

Tops of battery containers furnished were too light. They should be strong enough to permit loading drill steel, drills, and miscellaneous tools on top of the locomotives so that this material can be hauled in and out of the tunnel without having to couple on a car for hauls of this kind. On the job a false deck of 2x12-in. planks was provided for the top of each battery.

The headlight fuse location should be changed. It now is placed on the locomotive chassis between the two sections of the batteries and fuses cannot be renewed with the battery in place.

Receptacles for attachment plugs for extension lights, particularly for the red tail lights on the cars, should be installed on the locomotive.

The headlight switch should be located so that the motormen do not kick it to close it.

The flexible hoses for oiling main journals were removed because they caught on picks and other material and equipment piled alongside of the track. Pipe plugs were installed in the tapped holes of the journal boxes.

The controller resistance grids were covered to avoid breakage from material flying up from underneath.

The alarm bells were too weak for proper warning. The construction of the overload and reverse-current breakers on the charging panels was too light. Brush contacts pit and current flows through carbons of arcing tips. Stud through panel board pulled loose when nut in rear was tightened. The sheet metal used in making the operating handles is not satisfactory, since these handles continued to break until all of the metal originally furnished with the switches was replaced by other metal on the job.

The generators of the motor-generator set should be flat-compounded if the constant voltage system of charging is to be used. The compounding of the generators on this job was not as good as desired, the generators being somewhat unstable, but the manufacturers have agreed to take care of this before the sets are used again.

While considerable attention was given to the locomotives and batteries it is believed that the costs have been justified, since the equipment completed a year and a half of strenuous hauling without any serious delays and is in good condition at the end of the job.

### Shut-Down Order Standardizes Installation System

By W. C. FOSTER, Assistant Operating Engineer, Portland Electric Power Company.

Methods for shutting down lines or equipment for repairs have been worked out by the Portland Electric Power Company to a very full extent.

When the line, underground or station construction departments wish to have lines or equipment shut down for repairs or for construction purposes the superintendent of the department desiring the shut-down fills out a "shut-down order." This order form is made out in duplicate and notes in detail the line or equipment desired, the time it is to be ready, the work to be done, by whom requested and who will do the work. This order form is shown in the accompanying illustration.

If there are customers on the lines to be shut down, the orders first are sent to the service department. The service department keeps a file of the more important customers on each line. Upon receipt of an order the service department calls the customers that will be affected by the shut-down and explains the situation to them. If no serious objections are encountered a "Customer's Consent" sheet giving the customer's OK is filled out and attached to the order and both are sent to the operating engineer's office.

At the office of the operating engineer the "Shut-down Orders" are checked over. If operating conditions permit, the order will be approved,

dispatcher enabling him to put the equipment into service.

The order sheet is orange in color so that it is readily distinguishable from the other papers in the dispatcher's office.

### Tags Bring Pole-Top Information to Convenient Level

By C. L. LAWRIE, Assistant Superintendent, Record Department, San Diego Consolidated Gas & Electric Company, San Diego.

A system of equipment identification as worked out and applied by the San Diego Consolidated Gas & Electric Company is shown in the accompanying illustration. The tags are affixed to the pole at a height of about 6½ ft. from the ground and, reading from the top down, they give the name of the company owning the pole, the individual number of the pole by which it can be identified with its card in the office, the year it was set ('24), the system number of the transformer station which also corresponds to a card in the office files, and the size of the transformer. At the top of the same pole the transformer station number may be seen in larger figures on the kick-arm. It will be noticed also that there is a telephone arm on this pole, making it a joint pole; this fact, too, is indicated by the prefix P on the pole number tag.

The advantage of the tags shown in the fact that they may be read under all conditions of weather, night or day. They do not require a line crew to install but can be nailed on by unskilled labor while construction of the line is in progress or by the inspector of finished work. They may be changed readily and inexpensively when necessary. With the exception of the name plate and the year nail, which are purchased in quantity "ready made," the tags are produced on an embossing machine using No. 24 B&S gage, 7/8-in. strip brass. Other metals have been

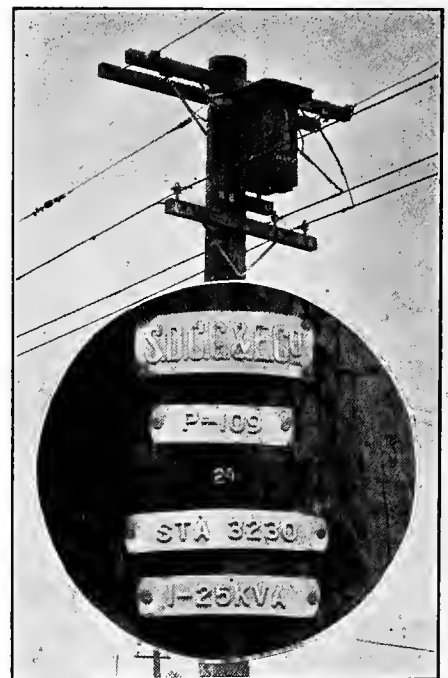
PORTLAND ELECTRIC POWER COMPANY	
SHUT DOWN OR HOLD ORDER	
No. _____	
Line or Equipment _____	
to be shut down from _____ M. Date _____ to _____ M. Date _____	
Work to be done _____	
Shut down requested by _____ Date _____	
Shut down to be called for by _____ Date _____	
Shut down approved by _____ Date _____	
Clearance given to _____ M. by _____	
Equipment cleared by _____ M. to _____	
Remarks _____	
HOLD ORDER FOR NEW EQUIPMENT	
Equipment to be held: _____	
Hold order requested by _____ Date _____	
Hold order approved by _____ Date _____	
Equipment held for _____	Reported clear, Date _____ M.
For Workmen _____	Reported clear, Date _____ M.
_____	Reported clear, Date _____ M.
_____	Reported clear, Date _____ M.
Equipment held for _____	Reported clear, Date _____ M.
Engineers' Approval _____	Approved Date _____ M.
_____	Approved Date _____ M.
_____	Approved Date _____ M.
Remarks _____	

Form used by the Portland Electric Power Company to order the shutting down or holding of any line or equipment. It is circulated to interested parties and standardizes the methods of handling.

assigned a serial number and any necessary remarks concerning procedure added. After approval of an order the original is sent in to the load dispatcher and the copy is returned to the department requesting the clearance.

On the same sheet as the above order is a "Hold Order for New Equipment." When any new line or equipment is being constructed or installed the department under which the work is to be done fills out this hold order giving full information as indicated in the accompanying illustration.

When filled out this order is sent to the operating engineer's office for check and approval. Here, too, are added the names of the different superintendents and engineers who are responsible for the different phases of the job and copies are sent to each of them. Before any line or equipment is released for service an approval must be secured from all of the men whose names appear on the hold order. This form of orders was adopted so that the dispatcher could have advance notice of the installation of new equipment. When finally filled out and containing the release approval of each of those interested in the job it constitutes authority to the



Typical pole-top installation and (insert) tag system which brings all information regarding the pole and its equipment to a convenient height.



tried, such as aluminum and zinc, but it has been found that while in many localities the aluminum tag remains in good condition for five or six years in proximity to the sea coast it disintegrates quite rapidly. The zinc tag apparently has even less resistance to atmospheric corrosion often failing in a year or less. The brass tag, together with the copper nails, costs about 2 cents.

The embossing machines, of which the company uses several, may be installed at main storerooms, in branch offices, on company trucks or on the backs of the inspectors' cars. Where the tags are to be placed by the line crew they are made at the storeroom and sent out with the other material for the job. When for any reason the inspector is charged with this work he makes the tags on the spot. This arrangement is very convenient also in the not infrequent contingency of inspection of new work revealing an incorrect or missing tag; in those cases where one or more of the tags on a pole must be changed for some reason not involving the work of a construction gang.

### Portable Camp Facilitates Line Construction Work

By C. S. KNOWLES, Superintendent of Construction, Pacific Power & Light Company, Kennewick, Wash.

Facing several years of transmission-line construction across barren, unpopulated country, the construction department of the Pacific Power & Light Company thought it necessary to devise some workable system of housing and feeding a construction crew without having to rely on towns. Some sort of portable camp outfit, which would make the men comfortable and which could be moved with a minimum of delay, was desired. After some experimenting the author devised and built a camp outfit that has met adequately the requirements of economy in first cost, economy in operation, and comfort for the crew.

The outfit consists of six tent wagons, called cars. These were constructed by erecting a 2x4 framework on the beds of low iron-wheeled, truck-type farm wagons manufactured by the Moline Plow Company. These frames, which define a room 20 ft. long by 8 ft. wide by 6 ft. high, are covered with tent canvas so arranged that the sides can be raised two feet all around for ventilation. This 2-ft. space is screened against flies and insects,

and screened doors and windows are provided. With each wagon carrying its own quota of camp equipment, the time and work of moving camp is reduced to a minimum. It is necessary only to hook the wagons on behind trucks and draw them at a maximum speed of about ten miles per hour to the new location where making camp is a matter of only a short time.

The six tent wagons were designed to take care of a standard construction and camp crew of 30 men. Three of the wagons are "sleeping cars." Each contains eight bunks completely equipped with mattresses, blankets, sheets and pillow cases. One "office car" contains a desk, typewriter, adding machine, and other office equipment and, in addition, four more bunks. These cars, with a small tent for the cook and his helper (on some jobs these two have been man and wife), account for the sleeping accommodations for the crew.

By careful conservation of space the "dining car" was made to hold built-in tables and benches to seat 28 men at one time, so that it is not necessary to run a second table. All table utensils are kept in this car. The kitchen car is equipped with a camp range, sink and work table, hot water system, and a full complement of pots, pans and kitchen equipment of all kinds. The stores of extra food also are kept in this car. In setting up camp it is customary to place the kitchen and dining car end to end, so that the cooks' work may be facilitated and so that no time is lost between the range and table. The total cost of the entire outfit, including all equipment, was about \$3,000.

The 30-man crew is composed of the following: one foreman in charge of camp and crew; one clerk to keep time, check material, buy food and supplies, pay bills, etc.; one cook; one cook's helper, who acts as general utility man and camp roustabout, and also threads bolts, bores arms, and does such other odd jobs on the construction work as is possible in camp; one carpenter; 4 truck drivers; 5 linemen; and 16 laborers. This has been found to be the most economical number of men to handle in one crew to take care of in one camp.

Realizing that speed and economy in any construction work depend in part upon a satisfied and harmonious working crew, considerable thought was given to those features of the camp having a bearing on the men's comfort and pleasure. Food served is the best

that can be procured and is prepared by good cooks having at hand all the facilities for maintaining a sanitary kitchen. Good beds and bedding in well ventilated sleeping quarters kept clean by the camp roustabout, hot water for washing, shaving and bathing, certain adequate sanitary regulations, all these elements have contributed to the comfort and well-being of the men. To provide a measure of entertainment during the evenings when the camp is located far from any town a radio was installed and made a part of the permanent equipment of the office car. A certain amount of camp discipline as to recreation is enforced. All games are stopped at 10 p.m. In short, the various elements making up satisfactory working conditions, simple enough to secure in a permanent camp but more complicated in a portable one, are made easier of achievement with the camp outfit described than with any other arrangement heretofore tried by the company in its moving construction work.

In operation it has been found economical to move camp by 6-mile stages. This means that the crews work 3 miles in either direction, causing an average working haul of only 1½ miles. Since the average speed of line-building has been about ½ mile of completed line per day, the camp remains in one place from 10 days to two weeks. Altogether, it is believed that this camp outfit has been a large contributing factor in a number of excellent cost records made recently in transmission-line construction.

A New Use for an Electromagnet has been found by Western engineers. The Idaho State Highway Department followed the lead of an Idaho mining company in using an electromagnet to remove pieces of metal from the surface of gravel roads. Certain portions of that state's highways have been giving motorists trouble due to the heavy collection of nails, wire, bolts, nuts and other miscellaneous metallic debris that has collected in the surface gravel. The "dry cleaning" process is accomplished by suspending a heavy lifting magnet from the rear of a 5-ton truck and in such a position that the face of the magnet is about 4 in. above the road surface. The first five miles of roadway treated netted 150 lb. of miscellaneous scrap metal. In the course of three trips made over certain portions of the Yellowstone Trail over 600 lb. of nails and scrap iron were retrieved.

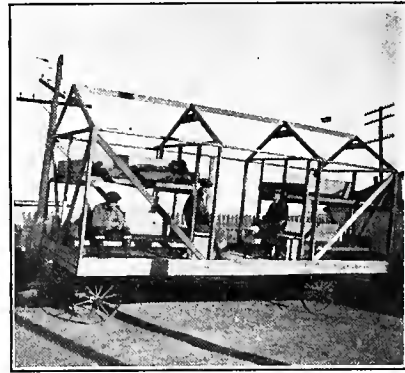
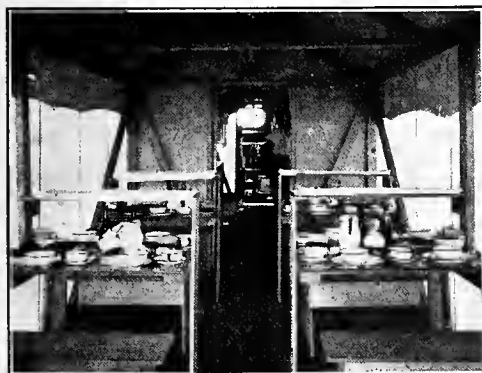


Fig. 1. Left—interior of "diner," or chow wagon, which is arranged to seat 28 men at one time; kitchen shows in the background. Center—interior of kitchen; this is a separate wagon and usually is backed up to the "diner," forming practically a single unit. Right—bunk wagon, or "sleeping car," complete except for canvas covering.

# IDEAS FOR THE CONTRACTOR

## Pumping Water for Irrigation with High Lifts Unusual Installation with 350-ft. Lift Proves to Be a Profitable Investment in Orchard

Engineers frequently have contended that pumping irrigation water on high lifts cannot be done economically. One installation which is thought to have the highest lift for commercial irrigation work has been installed in Medford, Ore. The installation is proving to be profitable and should encourage others to develop hillside tracts on the Pacific Coast.

Medford is located on the floor of a valley but many of its best orchards are on the side hills above the water line of the gravity systems. The tract with which this article deals is known as the Mira Vista Orchards, owned and operated under the name of the Rogue River Properties Company, Inc. It is represented by John Pike and F. Otis Booth, both of Los Angeles, Calif., and is managed in Medford by Bert Anderson.

Without water this tract would be useless and would be back in brush in a short time. Owing to the steep hillside, it was considered a problem to put water on it, at a reasonable cost. This was solved by designing and installing a two-stage centrifugal pump to deliver water to five different lifts in the orchard. A better idea of this arrangement may be obtained from Fig. 1. The highest lift is 350 ft. up the hillside and approximately one-half mile from the ditch where water is available.

Fig. 2 shows the pump house, canal

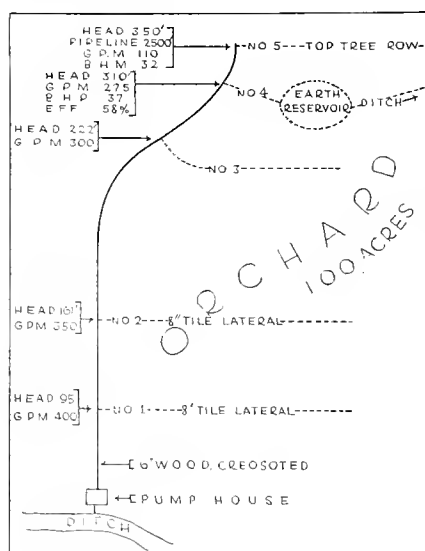


Fig. 1. Plan of system delivering water to five different lifts in the Mira Vista Orchards, Medford, Ore. The highest lift is 350 ft. up the hillside and approximately one-half mile from the ditch where water is available. The pump was designed to give the deliveries shown at the different lifts without overloading.

and concrete anchor on the pipe line. The pumping unit consists of two 3-in. DeLaval centrifugal pumps mounted on one iron base and connected in series as shown in Fig. 3. The motor also is mounted on the same bedplate and coupled direct to the pump by means of a DeLaval flexible coupling. The motor is a Western Electric 40-hp., 3-phase, 60-cycle, 440-volt and has a



Fig. 2. Pump house on the bank of the main ditch of the Medford Irrigation District, showing the concrete anchor on the pipe line.

full load speed of 1,750 r.p.m. The wiring is all in conduit and the meter loop is covered by meter trim: A 100-amp. three-pole safety switch was used for the main service. Overload and undervoltage protection was secured by the use of a type CR 1034 compensator.

A pressure of 160 lb. when the pipe line is full made it necessary to select heavy pipe and fittings for all of the work. A check valve and heavy gate valve were placed in the discharge. The velocity of the water was one of the factors which entered into the design of the equipment.

The water is pumped from the main canal of the Medford Irrigation District and delivered to the five lifts along the 2,500 ft. of pipe line. The pipe line is a 6-in. American Wood Pipe Company's creosote-coated fir pipe laid underground. At the different elevations the water is spilled through iron gate valves into tile spillways set vertical. From these cement tile laterals lead across the orchard and distribute the water by gravity flow through small vertical tiles containing slide valves for controlling the streams for each tree row. It is necessary to limit the streams to about the size of an ordinary lead pencil in order to prevent erosion, as any amount of water quickly will wash a small gully in the steep hillside.

One of the interesting features of this installation is its flexibility in delivery, the first lift in the line being

95 ft. where 400 gal. per min. is available. The second lift is 161 ft. where 350 gal. per min. is to be had. The third lift is 222 ft. with 300 gal. per min.; the fourth lift 300 ft. with 275 gal. per min., and the fifth and highest lift is 350 ft. with 110 gal. per min. The design of the pump is such that its capacity is according to the deliveries given. In other words, the impeller does not overload on the lower lifts. It is practical to use small quantities of water from several "lifts" at once, the quantity being limited to the amount available at that point and the total capacity of the pump. The fourth lift also spills into an earth reservoir from which a ditch leads to supply another block of trees.

The irrigation district's charge for water rights on acreage below the ditch is \$125 per acre, and the charge for acreage lying above the ditch is one-half of that amount, or \$62.50 per acre. The district has taken into consideration the fact that an owner will be put to additional expense for pumping, and consequently has fixed the acreage charge above the ditch on the above basis.

In this particular instance with 100 acres above the ditch the water rights will amount to \$6,250 for the entire tract, while the cost of pumping plant and pipe line was approximately \$4,000. Had this tract been below the ditch so as to have been served by gravity flow, then the water right for the 100 acres would have been \$12,500. It will be seen that the saving in the cost of water rights more than offsets the cost of the entire pumping plant. Further the yearly maintenance charge is cut in half, and the total saving is more

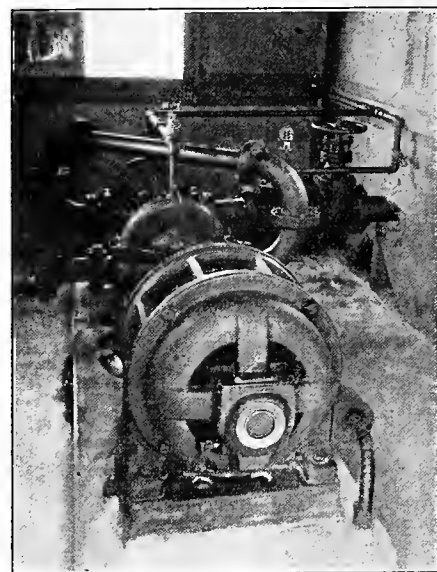


Fig. 3. End view of the pumping unit of two 3-in. pumps mounted on one cast-iron bedplate with the 40-hp. motor, direct connected by means of a flexible coupling.

than the usual cost for electric power and the interest and depreciation charges for the plant. The electric power is supplied by the California Oregon Power Company, and the rate



Fig. 4. Water is let into this vertical cement tile spillway from the pressure line through an iron gate valve. From this tile set on end 8-in. cement laterals lead out across the orchard.

for this unit is based on a charge of approximately \$17 per horsepower-year with a total annual minimum of \$700. This amount will take care of the usual season.



Fig. 5. Small vertical tile set on the lateral tile line, with small valves controlling the flow to each furrow.

Mr. Anderson conservatively estimates the increase of crop for the year 1925 to be not less than 2,000 boxes of fruit. Not only was the yield increased but the quality was improved and the trees had enough moisture supplied so

as to show a good growth. The varieties of fruit grown were largely Bartletts, Bosc and Winter Nellis pears and Yellow Newtown apples.

Two good years' returns will pay for the entire cost of this equipment, and because of some natural advantages of soil and less frost danger this orchard is expected to become more and more profitable. The entire installation was worked out by B. W. Paul of Medford, Ore., including the elevations, length and size of pipe required, the concrete work, and wiring as well as the pump installation. All of the work was done by Paul's Electric Store under the supervision of Mr. Paul. The unit was designed and built by the DeLaval Steam Turbine Company at its Trenton, N. J., works.



This sign in back of the Star Electric Company in Bakersfield, Calif., states a truth that some men overlook.

### Home Heated by Central Plant and Hot-Air Ducts

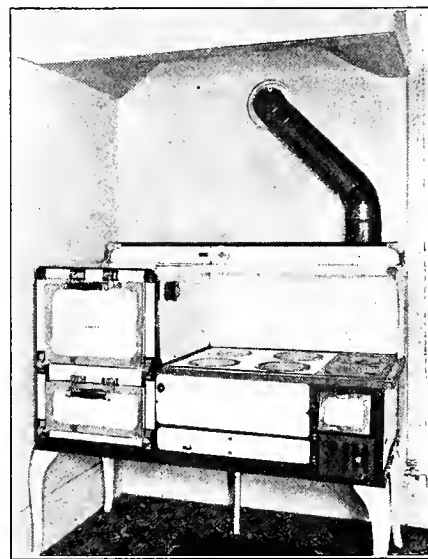
An electric air-heating installation in which a central heating plant is used in connection with a system of hot-air ducts has been made in the home of Fred Suelberger, Oakland, Calif.

The furnace consists of 48 elements totaling 25 kw. An 18-in. fan driven by a ¼-hp. motor produces the forced draft and distributes the warm air to the various rooms. A canvas connection between the blower and the heating chamber prevents motor vibrations from being carried to the distributing ducts.

The air intake valve may be set to receive fresh air from the outside or the air may be drawn from the room and be reheated. The number of heating units connected at any one

time is controlled by Cutler-Hammer relays mounted on rubber blocks. The relays are controlled by switches in the hall upstairs.

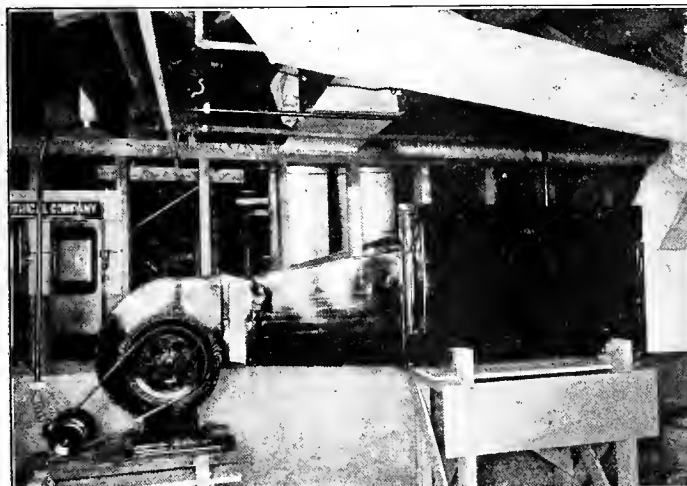
The furnace was manufactured by



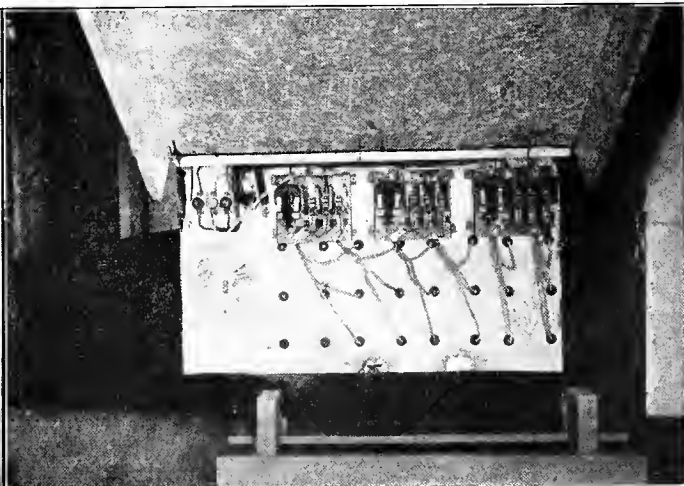
This 9¼-kw. range is installed in the home of Fred Suelberger in Oakland, Calif.

the Apex Manufacturing Company and was installed by H. Mellman, Oakland electrician. In addition to the heating equipment, the home contains a 9¼-kw. Monarch range. All of the electric equipment was sold by J. B. Sperry of The Electric Home Company.

**Court Rules Against Similar Names for Stores in Same Block.**—Terminating the controversy over trade names engaged in between the Electric Supply Company and the Electric Service Company, of Wenatchee, Wash., both firms having their places of business in the same block, the supreme court at Olympia has ruled that A. W. Hess, proprietor of the Electric Service Company, the more recently organized of the two, must choose a name more easily distinguishable from that employed by the older concern. The decision reversed the Chelan County superior court, which had refused to grant the relief sought by the Electric Supply Company.

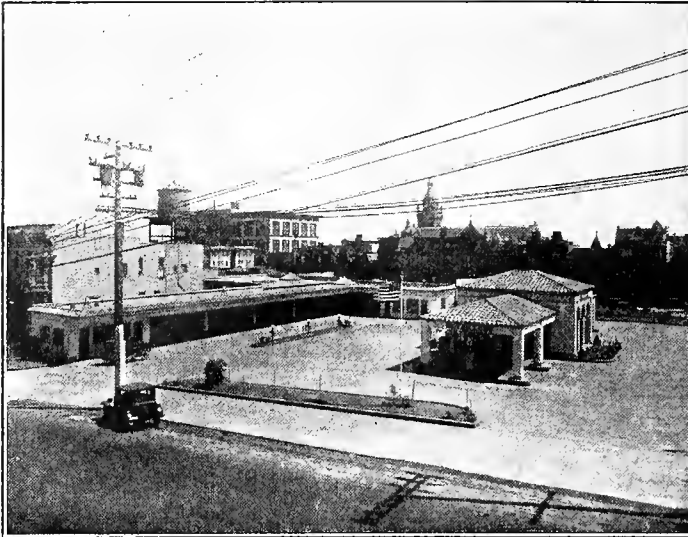


Electric hot-air furnace and blower used in heating the home described in the accompanying article. Regular hot air ducts distribute the warm air.



Relays which determine the number of heating elements in use at any one time. They operate at 110 volts although 220 volts are applied to the elements.





General view of the service station of the California Petroleum Company in San Francisco. Three of the floodlights may be seen mounted on the roof of the rear service station.



Night view of the Calpet station showing the good floodlighting installation. One of the lighted air and water standards may be seen on the extreme left.

## Electricity Important in a Modern Service Station

### California Petroleum Company Floodlights Elaborate New Station Recently Opened in San Francisco

Electricity played an important part in the establishment of the higher standard of construction for service stations that was used by the California Petroleum Company in a new station at Post and Franklin Streets, San Francisco. This station cost approximately \$80,000, excluding the pumping equipment. The station proper is constructed of glazed tile. The rear portion of the location is used for a battery station and a general automobile service station.

There are 24 lighting, one heating and one motor circuits in the station proper. Power is supplied from the power-company pole to the station by means of an underground service of three No. 0 wires. The general lighting in the station consists of ten totally enclosed diffusing units, four under each canopy and two in the salesroom. There are four circuits supplying the lamps in four copper signs in the station.

Each pump and oil stand is well lighted. The gas and oil tanks and the air compressor are located in the

basement. The lights in the basement are installed in vapor-proof receptacles.

The rear service station is supplied with 18 lighting circuits, 15 hp. in motors, a d.c. battery-charging set, and two 2-hp. 3-phase motors on motor-generating sets for additional battery-charging equipment. This portion of the station is supplied with a four-wire overhead service consisting of two No. 0, one No. 1, and one No. 4 wires; also a d.c. service of two No. 8 wires.

This portion of the station is lighted with 200-watt RLM reflectors. Seventy-six 75-watt lamps are used as border lights around the face of the structure to provide yard lighting. The air and water standards in the yard each are lighted. Galvanized conduit totaling 3,700 ft. was used in making the installation.

The station is floodlighted with six 500-watt GE L9 projectors. Each projector is equipped with stippled lens to eliminate glare. Without this protection against glare the rays of light would bother the drivers of machines

coming into the station. In addition to these large projectors, additional light is thrown on the face of the salesroom by means of four Wheeler sign reflectors equipped with 100-watt lamps with glass protectors. These will be concealed by shrubbery.

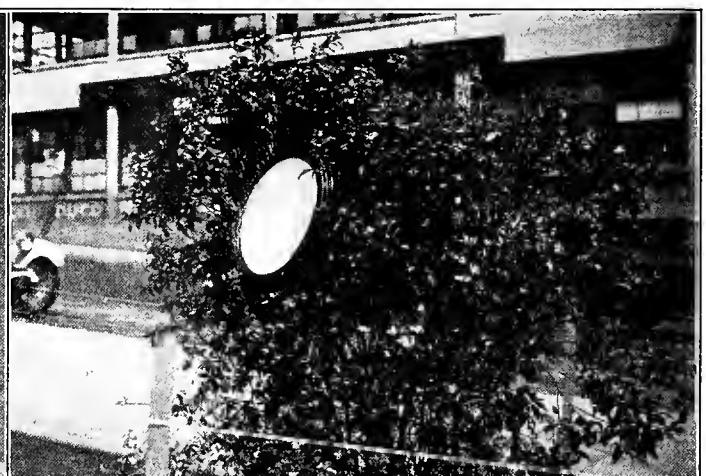
Three of the projectors are mounted on the roof of the rear service station; two on pipe standards 15 ft. high, and one on a short pipe standard about 3 ft. high. This latter projector will be concealed by shrubs.

Victor Lemoge, electrageist of San Francisco, made the wiring installation. After receiving the contract on the installation Mr. Lemoge built it up until the final amount of the wiring job was approximately nine times the amount of the original contract.

**Contractors Have Little Difficulty in Selling Red Seal Homes.**—That the Red Seal plan can be sold by contractors is evidenced by the activity of two contractors of Hayward, Calif. H. H. Fenneman of the Hayward Electric Company and Hugo Frank of the Frank Electric Company both are boosters of the plan, and each of them has four Red Seal homes under construction at the present time.



Four sign reflectors are used to supply additional light on the front of the salesroom. One of the floodlights mounted on a high pipe standard is shown on the left in the background.



One of the 500-watt floodlighting projectors with stippled lens which is mounted on a short pipe standard. In a short time this practically will be concealed by the shrubbery.



# Auditorium and Stage-Light Control in Schools

## A Description of the Modern Stage Switchboard Installed in the Compton Union High School

By LEWIS J. WELLS, Electrical Engineer, Safety Electric Products Company, Inc.

In the development of California the proper education of its present and future generations has not been forgotten. The average high school consists of a group of buildings, made up of class buildings, gymnasiums, shops, science halls, and the main auditorium. These buildings are very complete, especially as regards modern installations for the control of light, power, and often heat.

Dramatics are being taught in all of our schools. Without the proper control of light on the stage and in the auditorium theatrical performances cannot be presented satisfactorily to the interested public.

The consulting engineers of today are doing a great deal to assist the public and school board building committees simply by calling their attention to the need for this class of equipment at this time, by comparing past and present installations.

The switchboard of the past was hazardous while that of the present has all current-carrying parts insulated from its operator or people in its proximity. They also are constructed in such a way that the chances of fires are reduced to a minimum. There is a flexibility of light control obtained with the present composite semi-remote type of stage switchboard that could not be set up on switchboards manufactured only a few years ago.

One of the latest systems of stage switchboard as manufactured by the Safety Electric Products Company, Inc., has been installed at the Compton Union High School, Compton, Calif. This switchboard, known as the Diamond "S" composite semi-remote type, is different from the stage switchboards of past installations in that the individual control switches, master remote controls, dimmers and their operating levers, and magazine panel are built into one large unit. Individual plates are provided over each dimmer

section and these plates are removable from the face of the board by removing four machine screws. On removing the plates the wiring to both the double-throw circuit switches and sectionalizing tumbler switches is accessible.

The color master and footlight control circuit is provided with a special plug type pilot light automatically indicating the color corresponding to the color control and the name of the circuit.

The color master switches are electrically held closed contactors, mounted in the main switchboard controlled by double-throw knife switches; one position gives direct actuation of the contactor, the other position transfers the contactor-control circuit to the stage and house master control switches. The stage master control switch is in parallel with a flush receptacle located in the lower trim of the stage switchboard, which provides a means for remote control away from the board. The remote-control operation is made possible by providing a flexible cable complete with plug and single-pole, single-throw push button control switch. The house master control switch is a special three-way knife switch on the stage switchboard so connected that this control is extended to the office, and projection room.

The main busing consists of flat copper bus bar of such cross-sectional area that the current density is not more than 1,000 amp. per in. All other busing as from the circuit switches to the dimmers, individual tumbler switches, and to the magazine panel is slow-burning insulating wire, N.E. code capacity.

The magazine panel, which is of the dead-front, single fuse, plug fuse type, is mounted on one end of the switchboard concealed with hinged doors. The wiring from the circuit switches and dimmers is laid in 3 x 3-in. gutters,

thus reducing the amount of exposed wire visible from the rear of the switchboard.

The dimmer bank is built into the stage switchboard and all the plates are rated to carry their full load continuously without injury. Each individual dimmer plate is interlocked to its color master which is in turn interlocked to a grand master lever. To make the dimmer control more flexible each pocket color is provided with a pocket master lever arranged for interlocking with the respective color master. All dimmers are connected in the neutral side of the circuit, thus eliminating the possible chance of a burnout by a short circuit to ground.

The angle-iron frame and unexposed metal is painted with black enamel while the exposed surface is finished with blue crackle lacquer, a durable protection for the metal under all conditions. All crackle lacquers are dull finish and therefore reflect very little light, which is a boon to the operator's eyes.

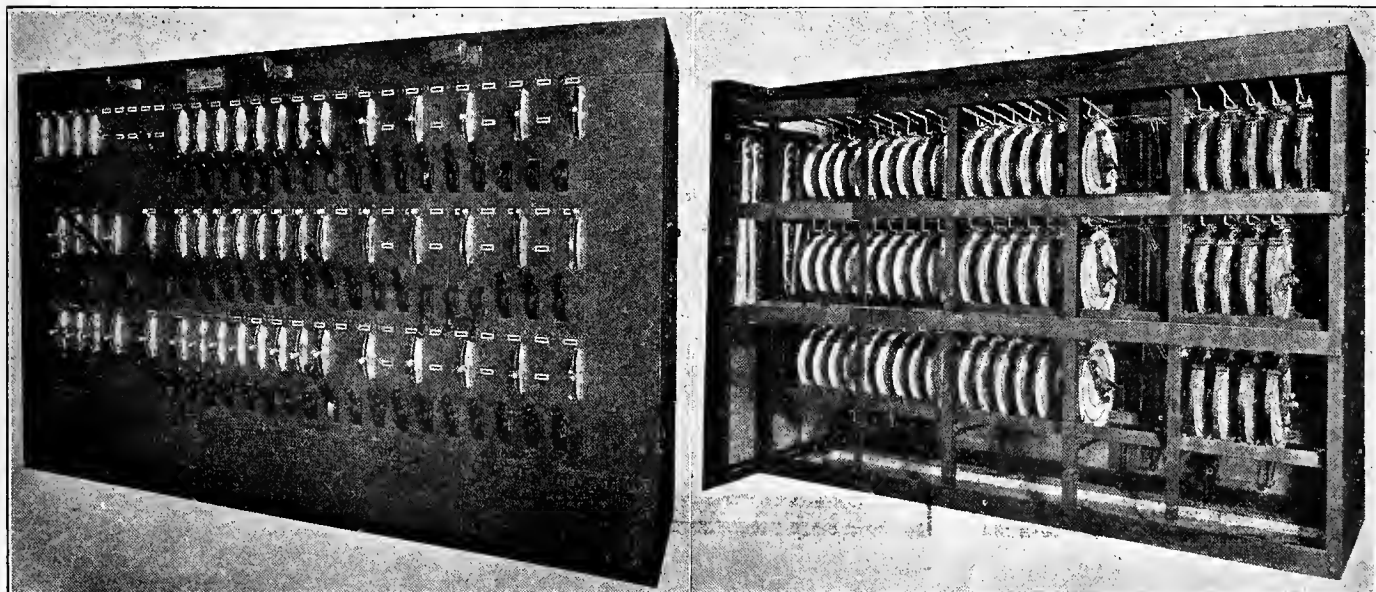
As this is a unit type of construction complete as a whole, the cost of installing is reduced and future upkeep expense to the owner becomes a minimum. This system is ingenious and simple enough to promise good service. The complete electrical installation in the school was made by the Baty Electric Company, electragists of Long Beach.

**Utah Town to Extend Lighting System.**—The city council of Payson, Utah, has decided to extend the whiteway lighting system of that town in the very near future. Lights will be installed along the west side of Memorial Park, which will add two more blocks to the system.

**C. B. Harper, proprietor of the Harper Electric Company, 117 E. Chapman Street, Orange, Calif., has sold his business to C. L. Alt.**

**E. Krebs and H. G. Blair have opened The Fontana Electric Company in Fontana, Calif.**

**Burgess Electric Shop, Arcadia, Calif., has moved into new quarters at 148 E. Huntington Drive.**



Stage switchboard installed in the Compton Union High School. This view shows the unit type of construction. Each horizontal row controls one color and each vertical row one color group.

Rear view of the board showing the rigid angle-iron frame construction, dimmer plates, wiring and wiring gutters to fuse compartment. The circuit fuse compartment may be seen on the left.

# BETTER MERCHANDISING

## Five Questions—And the Answers

House-to-House Selling, Special Sales, Lamp Sales, Fixtures,  
Windows and Advertising Discussed

Five pertinent questions were asked fifty or more dealers in electrical merchandising. For the most part they were well known and reasonably successful contractor-dealers. Many did not find time to answer the questions, but from those who did a very good cross-section of electrical merchandising sales policy may be obtained.

Electrical merchandising, at best, has been a hazardous undertaking in the past. Many dealers enthusiastic at the start have turned into more cautious merchandisers through sad experience. But there remains no reason why electrical merchandising cannot be made to pay, provided sales methods are developed out of that past experience which will serve as a guide in the future.

There are a number of successful electrical merchandisers. That alone proves that it can be done. But how?

The questions which were asked each of the dealers mentioned may be seen elsewhere upon this page. They are questions aimed at the very heart of selling policy. They are pertinent questions. They are almost impertinent, because the answers to them call for confession. The answers call for laying upon the table the trump cards of those who have played a winning hand. It took courage to answer them, and it took generosity of spirit, a willingness to pass on to others the fruits of the dealer's own bitter experience.

For this reason the following letters answering the five questions named are significant. They are valuable in what they set forth. They are worth reading and thinking over.

### "Found Ourselves Working for the Manufacturer"

Among the letters received one of the most complete was that of D. D. McFarlane, secretary-treasurer of the Newbery Electric Corporation, Los Angeles contractor-dealers well known for advanced merchandising policies and successful methods. These are his answers to the five questions:

1. "We do not use house-to-house salesmen in the manner in which we judge you mean from your question—having discontinued this practice three years ago, as we found it non-profitable, finding ourselves working for the manufacturer and the 'house-to-house' salesman, and not building up a clientele that would be of value to us in the years to come.

"We do, however, use salesmen who go to the homes and demonstrate to interested parties—this being particu-

### These Questions Were Asked

Five questions, each a potential mine of sales policy, were asked of leading dealers in electrical merchandising in California, Oregon, Washington and Idaho. The answers received to those questions will be found in the accompanying story. But here are the questions themselves:

1. Do you use house-to-house salesmen; if so what is your policy and what results have you noted? How do you select the best type of salesman and what ways of following prospect leads do you use?

2. Do you, on occasion, plan specials on some particular appliance at a reduced cost, and do you use this method to attempt to sell other appliances to those who come in answer to the special advertising?

3. What special methods do you use to promote lamp business? Do you find the fixture business profitable, and have you special representatives on this work?

4. Do you find your windows effective; are you "daylighting" them during daylight hours?

5. Do you use newspaper advertising space regularly; do you use direct-mail matter in envelope-stuffer form or other forms? What do you feel about the value of advertising in special editions of newspapers brought out to commemorate some special event? Do you feel that this sort of advertising really pays or do you consider it, as many do, a sort of "contribution to charity" to the newspapers?

Read what prominent electrical dealers have to say in answer to these pertinent queries regarding sales policies.

larly important in the selling of radio, as most of the demonstrations have to be made at night, when the programs are on.

2. "We do plan specials on appli-

ances at reduced prices, with the idea in mind of attracting customers into our store by display of these specials in our windows. This program is being sponsored at present by the merchandising division of the California Electragists, Southern Section, and has the co-operation of the Edison company in its district offices, as well as the co-operation of the manufacturers and jobbers in this district. As nearly as possible, this plan is laid out to tie in with the N.E.L.A. campaign, which is, as you know, backed by national advertising in the different magazines.

3. "The only method we have used specially to promote lamp business is by the appointing of a specially trained lamp man, whose duty it is to call on every prospect that would seem eligible for a lamp contract. The rendering of service by prompt deliveries, special engineering data, etc., helps in maintaining the business already received, and by continually seeking new customers your business will naturally build up on the law of averages.

"We maintain a fixture department, and by specializing on certain classes of installations, which we are best equipped to handle, it could be considered profitable. In this department we have six salesmen.

4. "We consider our windows one of our main advertising plans, and can emphatically say that they are of great value to us. As they are practically of western exposure, we find it necessary to daylight them only a short time in the morning, and again in the evening during the winter months. Most of the summer season we have to keep our awning down to overcome the sun glare.

"We are very much in favor of efficient window lighting and do not stop to consider the cost of this form of lighting. Our windows must be changed once a week, and if special occasion arises, oftener.

5. "In the past we have not been consistent newspaper advertisers, using them more for special announcements, making a larger spread at seasonal changes, but during the past six months we have allotted a certain amount to newspaper advertising, for a given period, and then apportioned it to a small ad three times a week, and feel that this way has been of greater value than our previous method.

"You speak of special editions to commemorate some special event, such as the opening of an office building, banks, etc., and we cannot say that we

agree with you that this is a contribution to charity, as we feel when we contribute to charity we have, at least, done some needy person a good turn, and cannot say that much in favor of these special editions referred to."

#### Oregon Dealer Finds Fixtures Profitable

E. L. Knight, proprietor of E. L. Knight & Company, electrical engineers and contractors of Portland, Ore., holds a number of differing opinions upon policies asked about in the five ques-

Electrical merchandise needs good salesmanship. The haphazard methods of the past won't do any longer. The electrical appliance has been discovered to be a money-maker by the department store, the drug store, the hardware store, and even 5-10-25-cent variety stores are taking to electrical merchandising such as it is. The buying public is no longer in the position of having to go to the electrical dealer for electrical appliances. And unless the electrical dealer uses aggressive selling tactics he is apt to find himself a worthy pioneer in the electrical merchandising game but nevertheless dropped in the procession long ago because he did not keep up. The purpose of this Better Merchandising Section of the Journal is to bring you electrical merchandising ideas, plans, policies and methods that are sound, practical, and tested by experience. If they are adopted and vigorously used they will bring rewards to electrical merchandisers and keep them at the head of the procession where they belong.

tions. In this territory he finds house-to-house salesmen necessary and successful and fixture business profitable. He says:

1. "We use house-to-house salesmen, and have had very good results. We select the best type of salesmen and follow prospects with personal calls.

2. "We plan specials on certain articles at reduced cost and our object in this is to get customers into the store.

3. "We have found the fixture business profitable, and have a special department. In connection with lamps, we stress the point to all salesmen of selling lamps when selling fixture orders, and have increased our lamp business quite materially due to this method. We also endeavor as much as possible to obtain lamp contracts which we find, if proper service is rendered, will be renewed each year and automatically increases the volume.

4. "We find our window advertising effective and the best method of advertising that we know of. We use some lighting during the day such as Mazda lamp displays and boudoir, table and floor lamps.

5. "We do not use newspaper advertising space regularly but do considerable mail advertising, and also envelope stuffers with our invoices and letters.

"In connection with the value of advertising in special editions of newspapers brought out to commemorate some special event, we do not feel that

this is the type of advertising that really pays."

Mr. Knight voices a well-nigh universal experience when he says of retailing electric appliances in competition with drug stores, department stores and hardware stores:

"We might add that the retail department of our business has always been a liability as an electric dealer when selling heating appliances is expected to make repairs without charge whereas department stores, hardware stores, drug stores, etc., can sell this same apparatus and the customer will invariably bring it to the electric dealer for repairs."

But he shows how he is remedying the situation by extra sales effort in major appliances. He continues:

"To establish our retail department on a sound footing we have been forced to go out and campaign on vacuum cleaners, washing machines, etc., and are at present pushing domestic automatic refrigeration very hard, and are having good results."

#### Uses Electric Sign Effectively

From Eureka, Calif., came answers to the questions from two contractor-dealers, the Janssen Electric Company and the Eureka Electric Company, both Electragists. Both dealers reported that they did not use house-to-house methods, preferring to follow leads with their own sales staffs. The Eureka company does plan specials on appliances and, although it makes no special effort to promote lamp business, does find fixture business profitable and has a special representative doing this work. It does not daylight its windows, but believes in the value of window display to promote sales, making window display a feature. The Eureka Electric Company uses advertising space regularly and finds that direct-mail matter, par-

ticularly circular letters, "bring A-1 results." It, too, considers the special edition a worthless medium for advertising.

The Janssen Electric Company does not have specials on appliances, but by personal alertness and window display attracts much business to the establishment. Lamps are featured often in window display, and fixtures are profitable, "if handled right." This company makes much of its windows and often daylights them during the darker hours of the day.

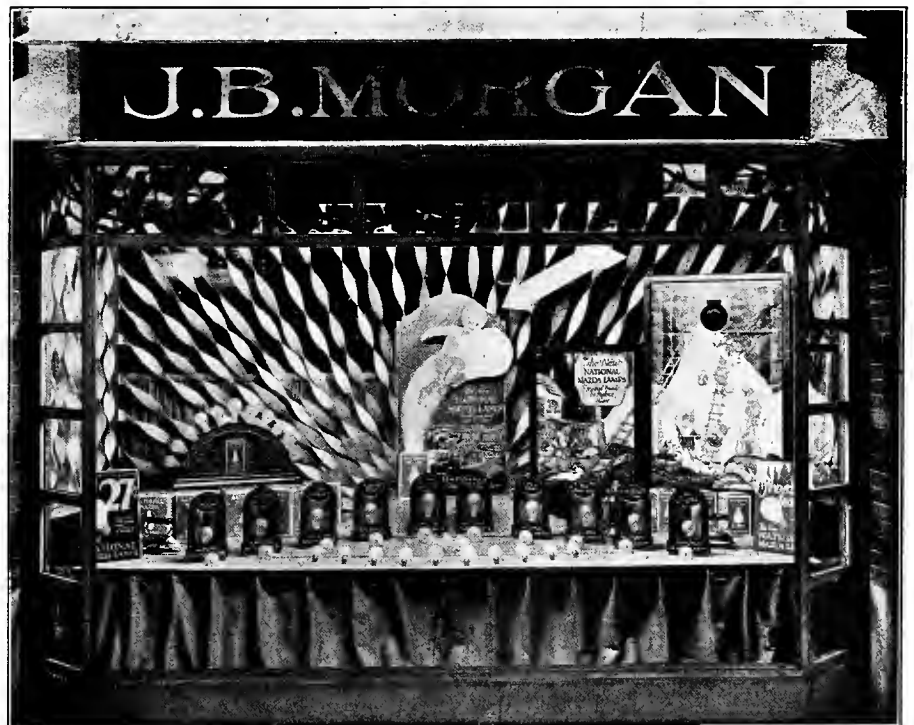
Although it doesn't use newspaper space regularly, the Janssen company uses direct mail frequently, and is likewise opposed to the special advertising page. Its best advertising medium, it says, is a large electric sign, upon which the wording may be changed. Of this it states:

"We have a large electric reading sign which we have found to be the best advertising medium yet. Practically every day we get direct results from this sign. In fact manufacturers of specialty lines are paying for space on this sign. This is not a billboard but an actual sign hung in front of the store."

#### "We Hope Never to Attempt It Again"

That the house-to-house selling has its great disadvantages is borne out further by the experience of the McNally Company of Pasadena, Calif. This company tried the plan but found it to be productive of more grief than good. The letter of C. A. Rowley of the McNally Company contains much food for consideration and gives in detail many salient points as to how his company deals with peculiar local conditions. He says in part:

1. "We do not follow a house-to-house salesman policy at the present time. We have tried it and the trial



An attractive entrant in the National Lamp Works lamp-display contest held recently was this window of the J. B. Morgan Company of Pasadena, Calif. Although it did not win a prize, the window has been considered one of the most attractive in Pacific Coast displays. Moreover, it sold a lot of lamps.

resulted in a considerable amount of business, but it has been of a type not entirely satisfactory. Reversions have not been numerous, but collections take an amount of time entirely out of proportion to the amount of business obtained. We hope never to attempt it again. In this connection we want to say that we have very little respect for the type of salesman usually procurable for this class of work.

2. "Yes, we do run special sales on appliances. At the present time we are tying in with the National Monthly Specials. Results have not been phenomenal, but all-in-all have been satisfactory. We have found that the specials act as a drawing card and that we are able to sell some merchandise at regular prices.

3a. "Our lamp situation is peculiar. The Pasadena Municipal Light Department supplies the public with lamps at a price slightly less than we can buy them for. This is due to the much larger discount they get on their lamp contract owing to the amount of business they do, which amounts to between \$85,000 and \$100,000 annually, figured at list. For this reason the average electrical dealer operates on an extremely small contract and is lucky to sell any lamps at all. We endeavor to sell lamps on every fixture job we do. We specialize on colored and fancy lamps, and make special efforts to have effective window lamp displays, etc., etc.

3b. "We do not find the fixture business profitable. Stock or box fixtures are handled here in Pasadena at an extremely narrow margin, there being branches of Los Angeles cut-rate houses here in town besides one or two local institutions which cater to the trade on price alone. Accordingly our fixture sales are very small, and usually consist of only a few "fill ins," or "extras." Now and then we sell fixtures for the service portion of large residences which we wire. We are not equipped to design and construct special iron fixtures such as are used in most of the best houses, therefore we are not in this field at all.

4. "Yes, we do find our windows to be effective. We make no attempt at lighting them during the daytime; but try to keep our trims fresh, and to change them frequently.

5a. "We use a small amount of newspaper space, depending on the regularity of our display to put over our story rather than the amount of

space we use. We are not spending the amount of money that advertising experts recommend, in fact, our appropriation calls for only about half of what they advise, viz, 1½ to 2 per cent gross. We consider advertising in special editions, programs, etc., etc., an absolute waste of money."

#### Salesmen Don't Pull Doorbells

More leisurely and hence more complete was the information given by J. C. Hobrecht, electrical dealer of Sacramento, Calif., in a recent interview. Mr. Hobrecht described at length some of the more successful merchandising ideas and policies found to be helpful in his business. That fixtures are not profitable where damaging competitive conditions exist; that the lamp business is a profitable and continuous business; and that specials are important in sales were interesting sidelights given by Mr. Hobrecht. But of the house-to-house solicitation he had much to say.

Mr. Hobrecht does not have his salesmen "pull doorbells" in the accepted house-to-house way. He believes in sending his salesmen out to the homes of prospects but only to prospects obtained in more legitimate manner. He has a man who follows up all inquiries reaching the store from one source or another. All leads are followed carefully and reported upon. In the sale of radios especially is this true.

"In the radio department I would be out of luck without salesmen who can go out to the homes and demonstrate the sets, following all leads. I have five men in the radio department doing this work."

Full commission is paid salesmen for all floor leads given them which they are able to close. This stimulates the salesman to do his best. In the sales of washing machines a demonstration of the machine is given and careful follow-up of the sale is made.

"I thoroughly believe in lamp display. In fact I try to have one of my windows devoted to a lamp display all the time. If I neglect to have a lamp window for a week the volume of lamp business noticeably drops off right away. This is true of any appliance displayed. The windows have a very great selling power and we change them often, making them as attractive as we can.

"The new 27-cent price on lamps, too, I think is a very excellent move.

Twenty-seven cents is a psychologically good price. It is better than 25 cents would be even, for it seems to hit the right balance between 25 cents and 30 cents."

The Hobrecht company has had some striking lamp displays. Mr. Hobrecht went on to explain that the window drew attention to the lamps, and that those coming in for a lamp were usually sold two or more. This brought up the subject of specials.

#### The "Teaser" Special that Attracts

"We try to have specials on something right along, just to keep people coming to the store. It need not be on electrical appliances necessarily, although we often feature a special in lamps or something small which we can buy in large quantity and sell very cheaply. We have found that silk tassels for light fixtures have been an excellent teaser to get people into the store. Maybe they did not buy anything than just the advertised article, but we get them in the habit of coming here.

"The same isn't true of larger appliances as specials though," Mr. Hobrecht continued. "When someone comes in to buy a waffle iron at a special price, that is usually all that he buys. The article itself is costly enough so that the buyer feels it is all he wants to go in for at the time. But with smaller articles we can more often sell other pieces of merchandise."

The fixture business, according to Mr. Hobrecht, has been hurt greatly by destructive competition and the tendency of some fixture dealers to sell jobs of fixtures on price rather than on merit or design.

"We used to do a great deal of fixture business. But now we have only one man on it. We can't make it pay in this crazy competition. It ruins it. It used to be that a builder could be sold fixtures on quality. It was worth some time and consideration to design and plan fixture installations. But not any more. An apartment house here recently with 16 apartments, that should have had \$1,600 in fixtures was sold a job of fixtures that cost it only \$600. The result is that quality has been absolutely sacrificed to price. This branch of the electrical business certainly needs something to stabilize it."

The Hobrecht store is a consistent and persistent user of advertising space in newspapers. It does not favor the special edition or one-time page, but prefers to use regular space and large display space when some special feature is planned. Direct mail also has been used effectively by this company.

In a campaign selling electric thermal jar cookers held during June Mr. Hobrecht sent out several thousand broadsides reproduced from the advertisement run in local papers. These broadsides were used as envelope stuffers by the power companies in the district, co-operating with his store.

**Successful Range Campaign in Wenatchee District.**—A successful electric range campaign recently was completed in the Wenatchee district of the Puget Sound Power & Light Company, in which the quota of 175 ranges was topped in a 60-day campaign. The majority of the ranges were sold to ranchers.



Two store windows in Salt Lake City in which daylight window lighting is being used. The reduction of street reflection is noticeable, even in a photograph. A new rate schedule for window lighting extended to daylight hours has increased daylight window lighting twenty-five per cent.



### Electragist Institute Closes Second Successful Run

The second merchandising institute to be held by the Merchandising Section of the California Electragists, Southern Division, recently has been completed. R. E. Smith, advertising manager of the Southern California Edison Company, speaking on "How, When and Where the Electrical Dealer Should Advertise," and B. A. Graham, California sales representative for the Chicago Flexible Shaft Company, speaking on "Selling Small Appliances," shared the platform.

During the ten-day period between May 24 and June 4 these speakers accompanied by C. J. Geisbush, executive secretary of the California Electragists, Southern Division, addressed interested audiences in the following cities: Glendale, Pomona, Santa Ana, Los Angeles, Compton, Santa Barbara and San Diego.

These meetings are evoking such evident approval that now it is planned to make them a regular part of the Electragists' annual program and to offer such institutes about four times each year. Combined attendance at the institutes this time totaled 225, and it was noted that a larger percentage of contractor-dealers composed the personnel of these meetings than in the previous institute, indicating that the dealers are growing more interested in the idea and are taking advantage of it.

### Send Refrigerators Frosted to Customer's Premises

Several progressive merchandisers of electrical refrigerators have adopted a plan of sending the machines sold to the homes of their customers with the refrigeration unit frosted and ready for immediate operation. The Southern California Edison Company has adopted this plan, and in the northern part of California J. C. Hobrecht of Sacramento has found this method successful.

When a shipment of refrigerators arrives Mr. Hobrecht has the machines uncrated and set up for operation upon the floor of his shop. Here the refrigerator is set in operation, and such adjustments and servicing as are required are done on the machine before it is sold or displayed. This method has eliminated much of the early service calls to get a refrigerator in adjustment when first purchased.

When a refrigerator is sold, the machine is put on the line and the unit completely frosted before leaving the store. In this condition the refrigerator remains frosted for several hours, more than enough to allow delivery of the refrigerator to the customer's premises. When it is delivered, it is plugged in on the customer's line and is already cold enough for immediate use as a refrigerator by the housewife.

A service man calls three times during the first ten days of operation of the new refrigerator, making such other minor adjustments as seem necessary. Seldom is any further servicing necessary. One man is kept upon this service work alone.

This plan has proved so successful that it may be worthy of adoption by any dealer selling electric refrigerators.

**Radios Stolen from Pasadena Electrical Dealer.**—Breaking into the store of the McNally Company of Pasadena last month, burglars stole \$700 worth of radio equipment, most of it from the windows of the store. Serial numbers on Radiola sets stolen were: model 26, 205,602; model 25, 114,636; model 25, 120,126. A Radiola III in a portable case, the speaker part of a model 102 loud speaker, the loop of a model 28, and a desk-type Burroughs adding machine also were taken. The above information is given in the hope that some reader of the Journal may be able to assist another reader of the Journal in tracing these losses, and that the Journal in this way may further its service.

**The Dalles Wins Range-Campaign Window Prize.**—In the campaign being run by the Pacific Power & Light Company for ranges, The Dalles, Ore., office of the company was awarded

the \$25 prize for best window display in the first part of the contest. The Pasco office was winner of two subsequent contests held later. Toppenish district led in sales of ranges in the contest being held between district offices in competition for the George A. Hughes trophy, presented by the Edison Electric Appliance Company.

**Electragists Show Wattage Increases in May.**—Reports turned in to the secretary of the California Electragists, Southern Division, show that members of that organization sold appliances in May representing a total wattage of 205,263. Of the special appliance for the month, featured simultaneously by all dealers, 60 were sold, representing increases to the lines in that section of 27,900 watts. Only twenty-two reports were turned in, or from less than a quarter of the membership.

This brings the total wattage of appliances sold since November to 1,678,372.

The image displays six postcards arranged in a 3x2 grid, each promoting the benefits of electric refrigeration. Each postcard features a title in a stylized font, a descriptive paragraph, and the Utah Power & Light Co. logo with the tagline 'Efficient Public Service'. The postcards are:
 

- Winter**: 'is truly the season when you most appreciate... Electric REFRIGERATION. More meals are eaten at home. More entertaining. It is first aid to the winter. Utah Power & Light Co. Efficient Public Service.'
- Economy**: 'Not alone through the big saving you make in keeping foods fresh, sweet and wholesome... Electric REFRIGERATION. Costs less than any other method. Automatic regulation gives you just the amount of cold you require—no more and no less. Utah Power & Light Co. Efficient Public Service.'
- Children**: 'makes it possible to also wholesome milk, vegetable fruits, Winter and Summer. Electric REFRIGERATION. Utah Power & Light Co. Efficient Public Service.'
- Now**: 'is the time to install. in your home for Winter and Summer service. Payments. Detailed into convenient monthly installments means no large outlay to enjoy this wonderful service. You can easily afford it! Utah Power & Light Co. Efficient Public Service.'
- Beauty**: 'than in any other modern house appliance. It helps in a big way the joy of the homemaker in tasks of the electric kitchen. Electric REFRIGERATION. Utah Power & Light Co. Efficient Public Service.'
- Dainties**: 'that charm because of endless variety, daintiness and exquisite taste are so easy to serve with. Electric REFRIGERATION. They are easy to mix—then just place them in the pans and serve when ready. Utah Power & Light Co. Efficient Public Service.'

Six of a series of sixteen postcards sent to prospects by the Utah Power & Light Company to educate them in the advantages of electric refrigeration. They were sent out twice a week beginning in January.

# NEWS OF THE INDUSTRY

## Steam Power Development Studied by A.S.M.E. at Hydraulic Session

Steam power development as applied to systems primarily hydroelectric was the feature subject under discussion at the hydraulic session of the A.S.M.E. Spring Meeting, held at San Francisco June 30. Other technical sessions included a general business meeting, petroleum session, industrial training and educational session, fuels and railroad session, oil and gas power session, and an all-day session on A.S.M.E. boiler codes.

Three papers were presented at the hydraulic session. These papers were as follows: "Aspects of Steam Power in Relation to a Hydro Supply," by A. H. Markwart, vice-president in charge of engineering, Pacific Gas and Electric Company; "Water Power and Steam Power in California Utilities," by H. A. Barre, executive engineer, Southern California Edison Company; and "Speed Changes of Hydraulic Turbines for Sudden Changes of Load," by E. B. Strowger, Niagara Falls Power Company, and S. L. Kerr, Jr., assistant hydraulic engineer, Wm. Cramp & Sons, Ship & Engine Building Company.

Economics involved in the water-power versus steam-power question is considered by both Mr. Barre and Mr. Markwart. However, their ideas and points of view differ. Both are agreed that for the most efficient development of water resources a combined steam and hydro program is essential. It is Mr. Markwart's idea that hydraulic power should be developed as fully as possible not only from the power-supply standpoint, but because of the conservation of natural resources effected and the development of and service to rural load centers adjacent to transmission lines. He believes that steam power should be provided and a co-ordinated system built up to effect the best system economy, for stand-by, for meeting the seasonal hydro deficiency during the short-water period on non-regulated streams, and for meeting the dry-year hydro deficiency. Mr. Markwart contends that with major steam power plants power can be delivered at load centers for about eight mills per kw-hr., and with a co-ordinated steam and hydro system for even less than that, considering oil to be as high as \$2 per bbl.

Considering oil at \$1 per bbl. and with 425 to 450-kw-hr. per-bbl. efficiencies effected at the new Seal Beach and Long Beach steam plants Mr. Barre quotes fuel costs at about 2½ mills per kw-hr. With this condition existing he states that further development of stream-flow hydro plants is practically out of the question and that even projected storage hydro

plants must be scrutinized more carefully than heretofore. Mr. Barre states that only an increase of several hundred per cent in fuel prices can change this condition. These last two statements of Mr. Barre's caused much discussion, and the consensus of opinion seemed to be that he was letting the pendulum swing too far in favor of steam development.

In discussion of these papers S. A. Moss, General Electric Company, Lynn, Mass., gave some interesting facts and figures showing the influence of industrial development and demands upon the design and construction of steam plants on Eastern hydro systems. He pointed out that this has made feasible the installation of units of from 5,000 to 15,000 kva., and he voiced the question as to whether or not the industrial development of the Pacific Coast would bring about a similar condition. R. L. Thomas, assistant to general superintendent, Pennsylvania Water & Power Company, criticized Mr. Barre's statements as being extreme and cited numerous factors in favor of a full development of all water-power possibilities. He suggested that steam more properly should be qualified as stand-by for transmission lines rather than for hydro plants. W. L. Abbott, Commonwealth Edison Company, Chicago, and president of the A.S.M.E., in speaking of Mid-West experiences, pointed to the advisability of transporting fuels to centrally located steam plants rather than transporting power over long transmission lines. Discussion and criticism of this statement pointed to the omission of consideration for the development of the territory traversed by such a transmission line.

The paper on speed changes of hydraulic turbines presented a mathematical discussion of the problems incident to the study of that subject as conducted on a 70,000-kw. unit. Methods of determining governor time were noted in the paper, and the relation of generator fly-wheel effect to speed variation was established. This paper was presented by R. S. Quick, of the Pelton Water Wheel Company, who also enlarged upon the mathematical consideration of water hammer and its effects. In discussion of this paper Roy Wilkins of the Pacific Gas and Electric Company took exception to the assumption of any fixed values of penstock-pressure rise in making calculations. He also stated that a practical solution of the problems of speed changes would be dictated by a proper economic balance between the costs of penstocks and the costs of turbine-generating equipment.

## Water and Power Act Gets Enough Signatures for Ballot

The twice defeated Water and Power Act again will find its place upon the initiative ballot in California fall elections. This became a fact June 30, with the filing with Frank C. Jordan, Secretary of State, of petitions containing 82,318 names of qualified electors. This measure is identical with the two preceding measures intended to authorize the state of California to issue \$500,000,000 worth of bonds for the development of water for irrigation and hydroelectric power.

The required number of signatures to give a measure place upon the ballot is 77,263. The petition from Alameda County, containing 11,332 names, gave the measure the number of names necessary to qualify. San Francisco names totaled 20,698. In Los Angeles, where the measure was falsely represented as being in support of Boulder dam, 50,288 signatures were obtained.

Preliminary campaign matter prepared by Franklin Hichborn, executive secretary of the California State Water and Power League, sponsoring the Water and Power Act, was in the form of an attack upon the regulation of utilities as carried on by the California Railroad Commission. The commission is criticised in this pamphlet for being an appointive body rather than an elective one. The Water and Power Act provides for the appointment by the governor of a board to develop and distribute water and electrical energy and administer the disbursement of the \$500,000,000 the act provides.

First submitted in 1922, the Water and Power Act was turned down decisively by a majority of more than 353,000 votes. Again submitted in 1924, it was turned down by a majority of 432,000 votes. The measure to be submitted in November is identical in wording and form with those defeated in the two previous attempts. Full text of the act was printed in the Sept. 1, 1924, number of the Journal of Electricity, p. 177.

**Utility Applies for Franchise in Thurston County, Wash.**—Application has been made to the commissioners of Thurston County, Wash., by the Puget Sound Power & Light Company for a 50-year franchise for the installation of poles, wire and necessary equipment for the transmission of electrical energy along various roads in the county.

**License Covering Sites on Columbia River Extended.**—The license issued by the Federal Power Commission to the Columbia Valley Power Company covering the Pelton and Metolius sites on the Columbia River has been extended for two years. This is done to allow more time in which to develop the market for the power which these developments will bring in.

## Agricultural Engineers Discuss Electrification at Lake Tahoe Convention

That any breaking down of system loads into their component parts such as is threatened by numerous municipalities can only result in undoing the progress already made by electric utilities and postpone the day when universal rural electrification will become an accomplished fact was the statement made by L. S. Wing, engineer, California Farm Bureau Federation, before the twentieth annual convention of the American Society of Agricultural Engineers at Lake Tahoe, Calif., June 23-26, 1926. In discussing rural electrification from an economic and engineering standpoint, Mr. Wing told the one hundred seventy agricultural experts representing thirty-one states that only with the economies effected by a highly diversified local load coupled with the further economies which result from interconnection and consolidation in general rural electrification possible.

In discussing the factors which influence rural rates and the extension of rural service he stated that rural service in general cannot be economically justified with such low consumptions per farmer of 300 to 1,000 kw-hr. per year. The only foundation upon which rural electrification can safely rest, he declared, is the sale of energy in quantities which will make the load profitable to both farmer and utility company. Mr. Wing also outlined the development of the rate schedules and line extension policies which have brought about the electrification of 65 per cent of California's farms.

The subject of rural electrification played an important part in the program of the convention. Experts discussed the application of electricity to the poultry industry, to the dairy industry and in orchard spraying. Prof. E. A. Stewart of the University of Minnesota and director of the Red Wing Project, declared that the electric utilities must furnish absolutely reliable service to the poultryman. He also described the recently developed application of ultra-violet rays to poultry for the curing of disease and the promotion of growth.

F. J. Zink, Iowa Community for Electrical Development, in discussing rural line characteristics stated that the utilities and the farmer must select equipment which will give high demand, diversity and power factors if rural extensions are to be profitable. He also warned against the use of home-made appliances which will not meet code requirements and the installation of wiring and equipment by anyone but an expert.

The use of electric power to drive stationary orchard spray rigs in the Wenatchee Valley, Washington, was discussed by Harry L. Garver, Washington Committee on the Relation of Electricity to Agriculture, who pointed out that a study of a number of the orchards served by the Puget Sound Power & Light Company showed that 97 motors aggregating 450 hp., utilized 60,000 kw-hr. during one season and sprayed the orchards at a cost of approximately \$2 per acre. More than 1,000 such outfits are in use in that section of the state and over 200 were sold during the present season, Mr. Garver declared.

Under the direction of E. A. White, director, National Committee on the Relation of Electricity to Agriculture, several meetings were held with directors of the various state committees for the purpose of co-ordinating the work in the different states.

One of the features of the post-convention trips taken by the delegates was a tour of the Spaulding-Drum hydroelectric development of the Pacific Gas and Electric Company for the purpose of showing the co-ordination of use of water for power development and irrigation.

### Aberdeen Votes Wynooche Bonds and Plans Initial Work

Following the passage at the recent special election of the proposed \$2,000,000 bond issue to be used by the city of Aberdeen, Wash., in the development of the Wynooche River power project as a municipal hydroelectric enterprise (Journal of Electricity, June 15, 1926, p. 589), the council has announced that preliminary work will proceed immediately. The measure passed by a majority of more than 1,000 votes.

The first step in the development will be the purchase of 700 acres of land and the Canyon dam site. Plans for the preliminary development will be presented to the council for indorsement during the next two weeks. A 4-mile railroad will be built at once into the site of the dam. The initial development of the Wynooche calls for the construction of a 115-ft. dam about one-quarter mile from the mouth of the Wynooche Canyon. This dam will raise the water in the canyon and will create a lake about two miles long and slightly less than a half mile wide. Ultimate development calls for a dam 240 ft. high, which will create a lake seven miles long and almost a mile wide at its greatest width. The large lake would flood 2,600 acres. The Wynooche dam site is owned by Mark Reed, and the price has been set at \$50,000, city officials state.

Passage of the Wynooche project bonds will not stop the plans of the Grays Harbor Railway & Light Company to develop a \$20,000,000 hydroelectric project on the Cowlitz River (Journal of Electricity, June 15, 1926, p. 588), according to W. W. Briggs, vice-president and general manager.

A. E. Cross, former city attorney, who has been a leader in the Wynooche power campaign, states that J. L. Stannard, who was consulting engineer of the Cushman power project, probably will be retained to supervise plans and construction of the Wynooche.

**Puget Sound Company's Bremerton Office to Start Building Unit.**—The Puget Sound Power & Light Company's district office in Bremerton, Wash., through E. T. Steel, manager, announces that work on the construction of the first unit of new buildings and extensions planned will be started immediately. Plans are now under way. First work will include an addition to the Fourth Street building recently purchased and construction of a large warehouse and garage structure adjoining.

### Los Angeles Violated Contract Edison Company Charges

Claiming violation of the power contract given by the city as part payment for the purchase of the company's distributing system in Los Angeles, the Southern California Edison Company June 21 brought suit against the City of Los Angeles and the Board of Water and Power Commissioners asking for an injunction to stop the operation by the Bureau of Power and Light of three diesel engine electric generating plants now being operated by the bureau, two in the San Fernando Valley and one near Slauson Avenue and Western Avenue.

The complaint recites the terms and conditions of the power contract executed by the city under which for a period of ten years from May 16, 1922, the city agreed to buy from the company all of the electric energy and power necessary to furnish the city and its inhabitants all of the electricity needed or required over and above the amount produced by the city at its own hydroelectric plants.

The complaint then charges that, notwithstanding the foregoing facts, the defendants now are producing and generating and turning into the city's distributing system and delivering to consumers for use within the limits of the city electric energy and power over and above the electric energy generated at the city's hydroelectric plants. The additional generation is from certain fuel generating plants located within the city near the intersection of Lankershim Boulevard and the Coast line of the Southern Pacific Railroad that consists of three oil-burning diesel engines each directly connected to an electric generator and a similar plant located near Slauson Avenue and Western Avenue, capacity of these plants being not less 5,000 kw.

The expenditures of public moneys in producing and generating electric energy and power through the operation of the fuel generating plants referred to and in turning such electric energy and power into the distributing system of the city and supplying it to consumers within the limits of the city "constitutes and will continue to constitute illegal expenditures of and a continued waste of public funds" of the city, the complaint alleges.

It goes on to state that it is necessary for the court to enjoin the defendants from performing the acts complained of in order to prevent a multiplicity of suits by the Edison company, as those acts "constitute a continuing breach of the city's obligations under the said purchase agreement and are causing plaintiff a continuing loss and damage and also are resulting in a continuing misapplication and illegal and wasteful expenditure of the public funds of the city. If the continuance of such acts is not enjoined by this court, it will be necessary for plaintiff to institute numerous and successive actions against the city to recover such loss and damage as the plaintiff from time to time sustains and is able to prove, and also numerous and successive actions against the members of said Board of Water and Power Commissioners of the City of Los Angeles, and other city officials, personally, to restore to the city treasury the public moneys and funds being illegally and wastefully expended as hereinabove alleged."

## Advertising Men Feature Utility Sessions at Convention

Advertising by public utility companies, especially in combating the repeated inroads attempted by public-ownership advocates, proved to be the subject of much discussion following a number of excellent papers presented at the public utilities departmental during the twenty-third annual convention of the Pacific Coast Advertising Clubs Association, held in San Francisco July 5-8. Public-utility advertising men also played an important part in the general activities of the convention.

At the first departmental, July 6, Ben S. Allen, public-utility advertising consultant, in speaking on "What Shall We Advertise; Is Courtesy and Service Enough?" urged the public utility to get away from its "inferiority complex." He said that too much emphasis on courtesy and service catered to the dishonesty and discourtesy of patrons and that some positive fighting for its own rights is necessary for each utility. He decried the practice of "whining" and said that a utility could tell the public its difficulties without whining. Services of a power company, he said, were no different fundamentally than merchandise of any other sort and must be sold soundly.

Capt. Norwood W. Brackett, director public relations, Puget Sound Power & Light Company, Seattle, gave a powerful presentation of the forceful arguments which must be carried on in "Combating Public-Ownership Propaganda with Advertising." He urged that even those companies not now threatened with public-ownership propaganda advertise the advantages of customer-owned utility operation under sound business management to acquaint the public with the advantages of the latter and forestall ignorant and misleading outcroppings of the public-ownership idea.

Carrying on similar thoughts and showing the new conception of ownership as the true public ownership, Al C. Joy, advertising and publicity director, San Joaquin Light & Power Corporation, Fresno, Calif., spoke on "Customer-Ownership as a Financial and Political Stabilizer." He outlined the history of customer-ownership and detailed the part played by advertising in making it successful.

Clinton S. Reynolds, supervisor public relations, Tacoma Railway & Power Company, was the last speaker on Tuesday afternoon, speaking of "Unworthy Advertising Media" and urging a unified stand in respect to them.

Mrs. Kate Brew Vaughn, director of home economics, Los Angeles Evening Express, and responsible for that paper's large home economics display and lecture room, told what women wanted to know of electrical merchandise by means of the advertising of the manufacturers at the second session, Wednesday. Her subject was, "Women as Purchasers of Trade-Marked and Nationally Advertised Goods." The influence of women in buying, she said, was overlooked. More than 85 per cent of all family purchasing is done by the woman, and she influences the other 15 per cent, Mrs. Vaughn said. She plead for the giving of real information in appliance advertising, showing what qualities in merchandise women demanded.

"The How, What, When and Why of Telephone Advertising" was analyzed meticulously and completely by W. J. Phillips, assistant vice-president, Pacific Telephone & Telegraph Company, San Francisco.

D. L. Scott, manager public relations, Los Angeles Gas and Electric Corporation, with a clever and provocative paper, "Some Sacred Cows of Advertising," described some of the major wastes in advertising appropriations due to faulty plan, careless handling of details, and special advertising pages or editions, novelties and the like. He urged that the departmental adopt the stand taken by the Advertising-Publicity Section of the Pacific Coast Electrical Association in its book of standards against such media. Mr. Scott was awarded the prize for the best paper presented in the public-utility departmental.

The trophy for the best display of advertising from a public-utility company was won by the Los Angeles Gas and Electric Corporation for its extensive display of advertising made in conjunction with the convention.

Other utility men were prominent in the convention affairs. A. C. McMicken, sales manager, Portland Electric Power Company, and president of the Portland Advertising Club, was active in getting the next convention of the P.C.A.C.A. for Portland, Ore. W. P. Strandborg, Portland Electric Power Company, and chairman of the public utilities departmental, was recommended for a second term. He was unable to attend the San Francisco convention.

**Utility Erecting 33,000-volt Line Between Thorp and South Cle Elum, Wash.**—The Puget Sound Power & Light Company has undertaken work of planting poles along the 27-mile power line between Thorp and South Cle Elum, under V. P. McNamara, resident manager of the company in Ellensburg, Wash. The power line will carry 33,000 volts. It will parallel the high line canal from South Cle Elum and will furnish power to the irrigation districts in that section.

## Fifth Power House on Big Creek Project to Be Begun

Work is to begin at once on the construction of the fifth power house on the Big Creek-San Joaquin project of the Southern California Edison Company. This new power plant is to be known as Power House No. 2A and is to be built immediately adjacent to the present power house No. 2.

Operating at a hydraulic head of 2,420 ft., the highest head of any of the plants on the Edison company's system, the new plant will have a generating capacity of 112,000 hp.

There are to be two 45,000-kva. horizontal generators, each of which will be driven by a double-overhung impulse-type turbine. The Westinghouse Electric & Manufacturing Company is building the two generators, which are the largest horizontal water-wheel generators ever built. The Pelton Water Wheel Company is furnishing one of the water wheel units and the Allis-Chalmers Manufacturing Company the other. Each of the water wheels will have a rated capacity of 60,000 hp. The normal speed of the two units will be 250 r.p.m., and they will generate at 11 kv., which will be stepped up to 220 kv. before transmitting. Each of the complete generators will weigh in excess of 300 tons. (Journal of Electricity, April 1, 1926, p. 276.)

In the matter of entering the penstock into the plant the company is departing from normal procedure radically. It has been customary to have the penstock extend to the level of the floor of the power house and then by means of an ell level out and enter the plant. Power house No. 2A is to be so close to the side of the hill upon which the penstock is to lie that it is planned to have the penstock enter the power house directly without passing through an ell. This will tend to increase efficiency and greatly simplify penstock construction.

Completion date has been set tentatively for early in 1928.



"A man's home is his castle." So's this kiddies' playhouse built for his small daughters, Clara and Alice, by G. H. P. Dellman, lighting sales engineer of the San Diego Consolidated Gas & Electric Company. It will be noted that the home carries the Red Seal, nor is this a comedy touch. The "homelet" here shown is entirely up to Red Seal specifications, and the fact that it is a vest-pocket affair makes no difference. It is completely wired throughout, equipped with daylight lighting units, and contains the prescribed quota of convenience outlets. An electric grill, ovenette, toaster and waffle iron are included in the home's furnishings, and at times these are augmented by various other electric appliances "lifted" when mother isn't looking. It is a family rule that when an appliance has not been used in the Dellmann home for a period of thirty days the children may carry it off to the playhouse for keeps. At the housewarming the girls served an electrically cooked luncheon for the family and several guests.



## New Substation of Great Western Company Put in Operation

An important addition to the distribution system of the Great Western Power Company has been made in the placing in operation of the company's new Grand Island substation near the town of Ryde, Calif. The substation was constructed at a cost of more than \$200,000. It will supply an important load for irrigation, reclamation and general farm use in that agricultural region.

The switch gear and voltage regulation apparatus are all automatic in operation. Transformers installed have a capacity of 9,000 kw. The substation will also serve to tie the Grand Island and Antioch substations. The substation is connected to the company's Brighton substation.

## Exchequer Plant Formally Opens When Coolidge Presses Key

With a ceremony climaxed by christening of the power house by dropping of Merced water 300 ft. to the roof of the plant from the top of the dam, and the generators set in motion by President Coolidge, in Washington, D. C., pressing a key, the Merced Irrigation District celebrated the completion of the Merced-Exchequer project June 23. A crowd of 1,500 agriculturists, civic leaders and notables attended the ceremony and heard read messages of congratulation from President Coolidge and Secretary Hoover. C. C. Young, lieutenant-governor of California, U. S. Webb, attorney-general of California, and Richard Shaffer, president of the Merced Chamber of Commerce, were the principal speakers.

Exchequer dam is located 35 miles east of the city of Merced on the Merced River. The dam is 330 ft. high with a crest length of 955 ft. The power house is located at the foot of the dam and contains two turbines, capable of generating 42,000 hp. Relocation of 17 miles of railroad line to the Yosemite Valley was necessary in the consummation of the project, necessitating one of the highest railroad spans in the country at one point where the railroad traverses the lake formed by the dam.

The entire output of the power plant will be absorbed at the switchboard of the Exchequer power house by the San Joaquin Light & Power Corporation, Fresno.

## Los Angeles Power Bureau Plans 47,000-hp. Development

Plans now are being worked out by the Los Angeles Bureau of Power and Light which will provide for the development of 47,000 hp. of additional hydroelectric energy in existing Owens River power plants as one feature of a great construction program for the bureau's electric system, according to a statement which has just been submitted to the water and power commission by E. F. Scattergood, chief electrical engineer.

The work now contemplated, stated Mr. Scattergood, is in line with the power bureau's plans as worked out when the Owens River aqueduct water and power project first was launched. Generation of hydroelectric energy along the aqueduct, he pointed out, necessarily is dependent on the volume of water passing through the aqueduct.

Year by year this volume has been increased to meet the growing needs of the city, and, as this volume of water is increasing, additional power development opportunities are presented.

"In connection with the development of this additional block of 47,000 hp. of energy, it also will be necessary for the bureau to construct a large new reservoir just above the present plant No. 1," Mr. Scattergood explained. "This reservoir will be situated near the present Fairmont reservoir and will be known as the Elizabeth Lake Reservoir. It will be used to regulate the flow of water through the generating plants immediately below."

In the city itself the bureau is at present working on a high-voltage transmission system which when completed will circle the city. It is planned to construct two new substations on this belt line, one at Central Avenue and 95th Street, and the other in the harbor district.

## West Coast Power Company Sold to W. B. Foshay Company

The properties of the West Coast Power Company, Portland, control of which passed about six months ago from A. Welch, then president, to Cammack & Company, Chicago, recently have been purchased by the W. B. Foshay Company, Minneapolis, of which A. Welch is Western manager. According to a statement issued by the purchasing company, the West Coast properties will be consolidated about Aug. 1 with other properties in eight states owned and operated by the Peoples Light & Power Corporation, Minneapolis, while the management will remain with the Foshay company. The physical valuation of the properties included in this consolidation is about \$8,000,000, and the gross earnings exceed \$1,000,000.

The West Coast Power Company is a little over a year old and has expanded substantially since its organization. (Journal of Electricity, April 1, 1925, p. 258.) It now serves the following towns in Oregon: Reedsport, Gardiner, West Gardiner, Florence, Glenada, Cushman, Waldport, Toledo, Newport, Yaquina, Clatskanie Junction, Westport, Quincy, Cascade Locks and Burns; and the following in Washington: Shelton, Cathlamet, Stevenson, Chinook, Ilwaco, Long Beach, Seaview, Ocean Park, Nahcotta, South Bend, Breakers, Newton, Tioga, Centerville, Shelbourne and Holman.

Ernst Jacobson, who was president under the Cammack ownership, now has resigned. S. J. Keys is general manager.

## Northwest High School Boy Wins Westinghouse Scholarship

Among the four winners out of fifty-two contestants in this year's War Memorial Scholarship conducted by the Westinghouse Electric & Manufacturing Company was F. Munro Redman, son of Frank M. Redman, sales representative of the Westinghouse company, Portland. Young Mr. Redman is the first successful contestant from the Northwest and the second from the Pacific Coast since this scholarship was established by the company to commemorate the war service of its employees.

Each year the company offers the

equivalent of college entrance examinations to applicants among the sons of employees, of college age, or among employees under a certain age, and grants to the four highest an annual payment of \$500 for four years in any university the winners choose.

Mr. Redman, who graduated from Grant High School, Portland, in June, has elected to study electrical engineering at Stanford University, Palo Alto, Calif.

## Delco Light Adds \$20,000,000 Plant Extension

Twenty million dollars will be expended within the next six months by the Delco Light Company in the expansion of its Frigidaire division at Moraine City, some four miles from Dayton, Ohio, it was announced by E. G. Biechler, president and general manager of the company. This expansion has been caused by the company's electric refrigerator business outgrowing the existing manufacturing facilities in the city of Dayton.

With the new plant the Delco Light Company will have a production capacity of 600,000 electric refrigerator units a year, more than doubling its present output. Manufacturing equipment will be installed which will enable the company to turn out Frigidaire units at the rate of four a minute. Approximately 36 acres will be added to the factory space of the company, making a total of 68 acres.

The enlargement of plant facilities provides only for estimated production needs for 1927, according to Mr. Biechler. This is only the beginning of the \$100,000,000 expansion program which the General Motors Corporation will put through if necessary to meet the demand for household and commercial Frigidaire electric refrigerators.

At the company's Taylor Street plant in Dayton the production of farm-lighting plants and water systems will be continued, and a total of 1,000 commercial refrigerator units can be produced per day. At the Moraine plant all facilities will be turned to the household refrigerator and the production of cabinets.

The decision to go ahead with this expansion program was made only after a careful survey of the potential market for household and commercial electric refrigerators in the United States which the Delco Light Company estimates as 16,000,000.

The two plants of the company have been working to their utmost capacity for some time. A new production mark was set in May, when 7,000 men working in double shifts crowded 3,600 man-weeks of overtime into the month. Company products during that month with a retail value of \$11,250,000 were shipped away in 623 freight cars.

**Substation Being Erected at Moyie, B.C.**—The Consolidated Mining & Smelting Company of Canada is erecting a substation at Moyie, B.C., from which it will distribute current provided by the East Kootenay Power Company to individuals and for street-lighting purposes. The Consolidated company recently completed a 500-ton concentrator at Moyie to treat the old waste dumps and the tailings of the St. Eugene mine mill, which was burned several years ago.

## News Briefs

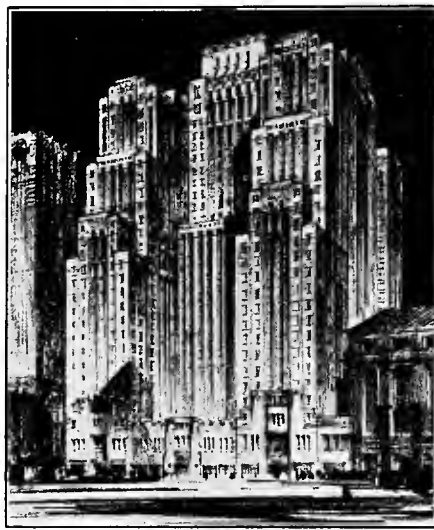
**Great Western Power Company of California Seeks to Purchase Napa Valley Electric Company.**—Application has been made to the California Railroad Commission by the Great Western Power Company, San Francisco, for permission to purchase all the outstanding common stock of the Napa Valley Electric Company, St. Helena, Calif., according to J. B. Black, vice-president and general manager of the former company. The purchase of the Napa Valley company would add to the Great Western company's system the towns of St. Helena, Oak Knoll and Rutherford and contiguous territory, all in Napa Valley. Electric energy is sold wholesale to the California Telephone & Light Company for distribution in Calistoga, and one of the most important retail consumers is the Veterans' Home at Yountville.

**Successful Customer-Ownership Campaign Staged by Washington Company.**—Sale of more than \$2,000,000 in its new 6½ per cent cumulative preferred stock in ten weeks is reported by The Washington Water Power Company, which resumed its customer-ownership program on April 7. The first block of \$1,500,000 was sold out within a short time and a second block of the same amount was authorized. (Journal of Electricity, May 15, 1926, p. 493.) Altogether 1,758 stockholders have been added with the new stock, which has a par value of \$100, and about \$1,063,000 has been paid in cash on the subscriptions, according to W. H. Ude, director of public relations for the Spokane company.

**Power Company Plans Transmission Line from Manteca to Salinas, Calif.**—The Sierra & San Francisco Power Company (Pacific Gas and Electric Company, lessee) has applied to the California Railroad Commission for authority to construct a 104-kv., single-circuit power transmission line from the Pacific Gas and Electric Company's substation at Manteca, San Joaquin County, to Salinas, Monterey County, by way of the Santa Clara Valley and Pacheco Pass, at an estimated cost of \$598,600.

**Seattle's Light Department Plans Erection of Ten-story Building.**—The municipal light department of the city of Seattle plans the construction of a ten-story building on Third Avenue and Spring Street, which will cost approximately \$1,000,000 and will house the offices of the city light department and a substation, expected to cost \$500,000 of the above sum. J. D. Ross, superintendent of lighting, and Glenn Smith, chief engineer, now are preparing plans for the structure, which will be erected within the next year. Another central station is of vital necessity, Mr. Ross states, to supply current for the downtown property recently contracted for. The light department offices now occupy scattered quarters.

**Stockholders Vote to Sell Power Plant and System at South Bend, Wash.**—The Willapa Power Company, South Bend, Wash., at a recent stockholders' meeting voted to sell its plant and system to W. B. Foshay & Company of Minneapolis for a cash price of \$110,000. It is rumored that the new owners will connect with the large power development on the Cowlitz River now under way by the Federal Traction & Power Company. The Foshay interests also have an option on the power plant of the Ilwaco Light & Power Company of Ilwaco, Wash. The Willapa Power Company was organized twelve years ago by residents of South Bend to furnish the city with light and power in opposition to the South Bend-Raymond Electric Company whose service was considered unsatisfactory.



Contract has been signed by the Graybar Electric Company leasing offices in what will be the largest office structure in the world, to be known as the Graybar Building. The new building will be located adjacent to the Grand Central Terminal, facing Lexington Avenue and situated between 43d and 44th Streets, New York. It will occupy over an acre and a half of ground and will be ready for occupancy May 1, 1927. It will house the entire New York executive offices and staff of the Graybar company. The new building will be thirty stories high. Sloan and Robertson are the architects, and the engineers and contractors for the project are Todd, Robertson, Todd, of New York.

**Endorses Installation of Uniform Lighting on Pasadena Street.**—The Colorado-Lake Avenue Improvement Association, Pasadena, Calif., has passed resolutions endorsing the installation of a uniform lighting system for the entire length of Colorado Street. Projects for the widening of Colorado Street are under consideration, and it is planned to install the new ornamental lights coincident with the other improvement work.

**Pasadena, Calif., Plans Installation of 1,000 Light Standards.**—Installation of 1,000 ornamental light standards during the fiscal year 1926-27 is the program of the Municipal Light and Power Department of Pasadena, Calif. For the fiscal year just ended 964 ornamental standards were installed; according to E. L. Bettanier, engineer of the department. Pasadena now has 2,800 ornamental lights in use, according to the report.

**Power Lines in Northern Idaho to Be Connected with Lines in Washington.**—The power lines of the Grangeville Electric Light & Power Company in northern Idaho will be linked with those of the Pacific Power & Light Company in Washington, officials of the latter company state. A power line 18 miles long will be constructed from the east end of the Yakima-Walla Walla system of the Pacific company to run from Lapwai, Idaho, to Reubens, Idaho. It will cost \$50,000. A substation will be built at Cul de Sac.

**Imperial Valley Company to Acquire Yuma Company.**—Yuma Light, Gas & Water Company has been authorized by the California Railroad Commission to sell and transfer an electrical distributing system located in Winterhaven and vicinity, Imperial County, to E. J. Condon and David O. True, who in turn are granted authority to transfer the franchise and electrical distributing system to the Imperial Valley Electric Power Company. Imperial Valley Electric Power Company has been authorized to acquire the electric system and to issue on or before Oct. 1, 1926, \$2,000 of common capital stock in full payment therefor.

**Northwestern Company Permitted to Appropriate Additional Water from Elwha River.**—Permits authorizing the Northwestern Power & Light Company of Port Angeles, Wash., to appropriate an additional 200 sec.-ft. of water from the Elwha River for electric development and to store additional water in the Glines Canyon reservoir have been issued by R. K. Tiffany, state supervisor of hydraulics. The company now holds the right to appropriate 800 sec.-ft. of water from the stream and to store 50,000 acre-ft. in the reservoir. Total development cost is placed at \$1,000,000 and the estimated capacity of the proposed plant is 16,000 hp.

**Puget Sound Company Prepares for Expansion of Baker River Project.**—Planning the expansion of its present power site holdings on the Baker River project, the Puget Sound Power & Light Company has filed application with the state hydraulics office, in Olympia, Wash., for an additional 140,000 acre-ft. storage reservoir near the present holdings to be built at a cost of \$100,000 during 1928-29. Submerging a total of 2,255 acres to a depth of from 80 to 255 ft., the new reservoir will have a concrete dam heading 275 ft. high. Across the top of the dam will be 23 spillways, each having a width of 10 ft.

**Half Moon Bay Line to Be Transferred to Pacific Gas and Electric Company.**—Great Western Power Company of California has applied to the California Railroad Commission for authority to sell and Pacific Gas and Electric Company to purchase an electric transmission line between San Gregorio and Pescadero, San Mateo County, for the sum of \$54,047.67. The transmission line, which is about 11½ miles in length, plus laterals, is being transferred to Pacific Gas and Electric Company in pursuance of an agreement between the utilities whereby duplication of facilities will be eliminated in this territory.



## News of the Electragists



### Electragists Outline Progress and Plan for Future at Meeting

Progress reports and constructive planning for the future marked the fourth quarterly and the first annual meeting of the California Electragists, Southern Division, that was held at San Diego, June 26, as one of the milestones in the history of the organization.

#### Executive Committee Report

The morning session was called to order by President Harry Walker of Los Angeles at 9:45 a.m. with over 100 delegates in attendance. Mr. Walker read the report of the executive committee. This included a brief history of the organization followed by the work of the committee. The two major problems considered were: First, better jobber relations obtained through the work of the trade policy committee. This included twenty-seven meetings with the jobbers. Second, the securing of better co-operation between the credit and sales departments of the jobbers. This phase of the problem included: (a) a better classification of accounts of those entitled to purchase; (b) opening new outlets in saturated territory; (c) selling consumers direct, and lamp and fuse contracts between jobbers and industrials; (d) the position of the electragist as a buffer between the industry and the various electrical departments and the building industry; and (e) a credit accounting system. In discussing the subject of better bookkeeping and accounting systems the executive committee called attention to the fact that the contractors as a group are weak and that this phase of their business should be improved upon. The committee felt that electrical jobbers should demand a financial statement from a contractor before extending him credit the same as a bank does before it extends financial credit. It stressed the fact that opening new accounts in a district that is adequately served is unwise. The evil of selling

a customer's customer in any business was pointed out. The national trade policy of the electragists was reiterated as: manufacturer to jobber to contractor-dealer to consumer. The electragists do not object to a jobber selling to industrials which maintain a



An informal discussion on the lawn: from left to right—R. I. Carruthers, Southern California Edison Company; R. F. Doll, electragist of Glendale, and R. M. Fry of Los Angeles.

regular electrical department, but they do object to this practice in cases where the work ordinarily would be done by a contractor. The fairness and broad viewpoint of the electragists again were shown when contractors were requested to practice the announced policy of distribution.

#### Motor Section

The report of the recently organized motor section was made by Warren M. Thorne of Norton & Norton, Los Angeles.

#### Estimators Section

R. L. Booth, The English Company, Los Angeles, gave the report covering the activities of the estimators' sec-

tion. He outlined the history of the organization as being an outgrowth of one of the lessons in estimating which was given to the Los Angeles Electrical Contractors and Dealers Association by C. J. Geisbush. The organization meets at the office of the Los Angeles Association every Thursday noon. Estimating methods and comparative time studies are being conducted by members. The estimating system of the Association of Electragists, International, has not been adopted by the organization, but it is being used by a number of the members and the results are being compared with those obtained by other methods. A committee to work with architects has been appointed which is endeavoring to have the electrical plans completely laid out and then have sufficient time allowed to estimate them properly. In one particular job studied containing some 45,000 ft. of  $\frac{1}{2}$  and  $\frac{3}{4}$ -in. conduit, the difference in estimates amounted to 30 per cent. In such a case the low man might add 20 per cent to his estimate and still be lower than the man with a correct estimate who put in his bid at cost.

#### Merchandising Section

O. N. Robertson, Robertson Electric Company, Santa Ana, presented the report of the merchandising section. In his report Mr. Robertson stated that the future volume of business in the electrical industry must come from an increase in the sale of labor-saving devices in the home rather than from electrical installations in large office buildings and similar structures. In speaking of the merchandising institutes he stated that the first one consisted of seven meetings held in various cities and was attended by 350. The second was attended by 225; although attended by a smaller total number, a greater number of those present were contractor-dealers. One specific result consisted of an electragist selling a building containing 165 apartments so that it would conform to the Red Seal specifications, basing his sales talk on that presented at the institute. The electrical estimate on this job was increased from \$14,000 to \$27,000. The committee expects to continue the institutes at intervals of about three months; to be successful, however, they must receive the support of the industry.

Contact obtained with other branches of the industry has been valuable; further contact is necessary as all four



Part of the reception committee of San Diego electragists: left to right—Fred Edwards, O. W. Karl, Mrs. J. F. Zwiener, J. F. Zwiener and C. C. Clardy.



The electragists' baseball team which so well defended the honor of the organization by defeating the jobbers and manufacturers' team in the game at Balboa Park.





A large number of women were in attendance at the fourth quarterly meeting of the California Electragists, Southern Division, as evidenced by this picture taken at Balboa Park following the baseball game and lunch.

branches of the industry must work together to get the desired results. Major problems before the industry which must be solved this year include: time payment plans; service; number of lines of merchandise to be handled; full list price in effect by all branches of the industry. Reasons advanced for the contractor-dealer being a poor credit risk included figures gathered nationally which showed that the overhead in business was from 35 to 38 per cent, figures higher than most of the discounts prevailing in the industry to contractor-dealers. It was stated that overhead would have to be reduced or discounts increased.

The contractor-dealer has the first contact in the home; he then has an opening to sell the lighting fixtures; then the appliances, water heaters, refrigerators, and his service. Wide opportunities thus are offered to the live contractor-dealer.

R. I. Carruthers, assistant sales manager, Southern California Edison Company, stated that the power companies want to co-operate with the electragists, and urged that any complaints be taken up direct with the company concerned so that the difficulty might be corrected. He stated that a definite need existed for a uniform range wiring layout, and expressed the hope that this would be forthcoming in the near future.



An interested group of spectators watch the ball game. Harry Walker is holding extra ammunition. Helen Mikesell, executive secretary of the Los Angeles Electrical Contractors and Dealers Association, E. O. Flagg and Perry Mortinson, both of Santa Barbara, are seated on his left. J. E. Cope of Santa Ana is standing behind him.

#### Afternoon Session

The Red Seal Plan was discussed at the afternoon meeting by H. E. ("Shorty") Sherman, Illinois Electric Company, who is chairman of the Red Seal program in the Los Angeles district. He stated that selling the idea of the Red Seal Plan was the most important problem before the industry, and that one of the most effective methods of putting this over was for everyone in the industry first to become familiar with the plan and its possibilities. He said the Red Seal is an additional talking point for the builder; architects when properly informed also desire it.

P. L. Booth, Edison Electric Appliance Company, reported on the last meeting of the Advisory Committee of the California Electrical Bureau. He stressed the importance of the success of the Red Seal program and of an increase in membership in the electragists' organization.

Other speakers at this session included Rollin Smith, Rollin Smith Engineering Company, and L. J. Penn, National Automotive and Electrical School, both of Los Angeles.

#### Members' Meeting

The members' meeting was held immediately following the general session in the afternoon. Officers of the Southern Division were re-elected unanimously as follows: president—H. H. Walker, H. H. Walker Company, Los Angeles; vice-president—Frank McGinley, Harbor Electrical Company, Wilmington, and secretary-treasurer—C. W. Jones, Pomona Wiring & Fixture Company, Pomona.

C. J. Geisbush, executive secretary, reported on his work for the year.

#### Entertainment

Approximately two hundred delegates made the trip to San Diego aboard the Ruth Alexander, leaving Los Angeles harbor Friday night. Dinner and dancing were enjoyed after leaving port. The boat was met Saturday morning by buses which had been provided to take the party to the Hotel San Diego. During the morning sessions the ladies were taken on a sightseeing trip to interesting landmarks in the vicinity of the city.

The annual baseball game between the electragists and the jobbers and manufacturers was held at Balboa Park; following the game a box lunch was served.

The banquet and ball were held in the Pompeian Room of the Hotel San Diego, Saturday night. They were attended by more than 200.

## Book Reviews

### ELECTRICAL ENGINEERING

By L. A. Hazleton, M.E. (Stevens), Professor of Electrical Engineering, Stevens Institute of Technology; Fellow A.I.E.E.; Member American Society of Mechanical Engineers; Fellow Institute of Radio Engineers; Fellow American Physical Society. Published by The Macmillan Company, 1924; 625 pp.; 364 illustrations.

This textbook is a concise treatment of the various elements of electrical science and of its application to the various branches of electrical engineering. It is based on the text given to the author's classes in electrical engineering at Stevens Institute of Technology. Accurate presentation of each branch, together with the novel method of treatment as well as clear-cut explanation and figures, results in a text which should be of great value for college study.

Contrary to the method advocated by some authors of similar books the electron is not introduced at the beginning of the text. Instead the first chapter is devoted to the basic ideas of physics which underlie all branches of engineering. The concept of energy is given outstanding prominence, and mechanical force is introduced as the space rate of energy. According to the author, this is done for three reasons. First, because he believes that this is the true philosophical basis for the idea of force; second, because of its analogy to the method of introducing voltage and magnetomotive force; and third, because it is this definition of force that is directly applied in subsequent chapters to calculate all electrostatic and electromagnetic forces.

The second chapter goes into the subject of electric conduction followed by chapters on electrostatics and electromagnetism. Here the method is followed of first presenting the basic experimental facts and then introducing the physical conception of these facts to develop concise laws and to apply these laws to specific problems. Chapters five and six treat alternating currents and transient currents and electric waves. The next chapter, which treats of conduction in gases and electrolytes, is a brief explanation of this most modern branch of electrical engineering. The vacuum tube and its principal applications is presented in a clear-cut and brief but thorough manner. From this chapter the book takes up the discussion of engineering apparatus treating electrical measuring instruments, direct-current machines, synchronous machines, induction machines, and transformers and concluding with chapters on transmission, distribution and electrical communication systems.

To add to its value as a text book typical problems are given throughout. Mention should be made of the excellent diagrams and drawings which are used and which should add materially to the value of the book, both from the standpoint of class-room study and as a reference book for practicing engineers.—E.R.S.



**SUPERHEAT ENGINEERING DATA**

A handbook on the generation and use of superheated steam and related subjects. Sixth edition revised. (Superseding "Data Book for Engineers"). Bound in keratol, 4½ x 7 in. 208 pages. 85 illustrations and diagrams. 69 tables. The Superheater Company, New York and Chicago, 1925. \$1.

In this handbook the authors have endeavored to condense for ready reference the data most frequently desired by steam power-plant engineers and operators. One of the features which makes this handbook quite easy to use as a reference book is the 16-page index which is both complete and a cross index. Superheated steam, its advantages over saturated steam, and the proper design and performance of superheaters are discussed briefly. Typical superheater arrangements for practically all stationary, marine and locomotive type boilers commonly used in America are illustrated. Superheaters for special services, such as conserving waste heat, for separate firing, and those of a portable type also are shown. Comparative data concerning sizes, tube sizes, arrangements of tubes and related data for stationary watertube boilers also are covered briefly. The steam tables given cover pressures from below atmospheric to 600 lb. absolute and include the properties of superheated steam, from 50 to 300 deg. F. superheat.

Information for figuring piping for the handling of water saturated in superheated steam, velocity and pressure drop of water and steam flowing through piping, is covered in the section on piping. Proposed American standards for high pressures also are included in this section. Tables of heat values for gaseous, liquid and solid fuels are included in the engineering data on coal and oil-fired boilers. Complete conversion tables and data on bolt and screw threads combining the recent work of the American Engineering Standards Committee and the National Screw Thread Commission are included among the miscellaneous data given in this handbook. Also there is a collection of miscellaneous tables frequently used by steam engineers.

**ALTERNATING CURRENTS AND TRANSIENTS**

By F. M. Colebrook, B.Sc. (Lond.), D.J.C., A.C.G.I., Assistant in Wireless Division, National Physical Laboratory, Middlesex, Eng. First edition, 1925, 195 pages, 97 illustrations, 6 x 9 in. McGraw-Hill Book Company, Inc., New York. \$3.

This book is intended for the use of students of applied electricity and has been prepared for the purpose of providing such students with a useful mathematical equipment for the solution of many of the theoretical and practical problems likely to be encountered in the study and practice of the subject.

The rotating vector method used throughout the book is the result of the author's attempt to clarify and harmonize the methods and nomenclature of pure vector analysis developed by Heaviside, Gibbs and others with the rotating vector method. His experience has shown that the introduction of the terms "imaginary" or "complex" into what are essentially real and simple operations is a hindrance rather

than a help to the student when this method of analysis first is considered.

Chapter 1 takes up vectors and vector operators, followed by Chapter 2 on the scalar product of vectors, and variable vectors. Then follows the application of vector analysis to alternating currents, with which are linked chapters covering problems involving distributed capacity and inductance and damped electric oscillations. Chapter 7 treats the application of vector analysis to the theory of alternating currents of irregular wave shape. The book concludes with a chapter on symmetrical polyphase systems.

This text should be of considerable value to advanced students in electrical engineering. Examples and answers to examples at the end of each chapter also should be quite valuable. A rather complete bibliography dealing with vector analysis is presented at the end of the book.

E.R.S.

**COMING EVENTS**

Association of Electragists, International—  
Annual Convention—Cedar Point-on-Lake-Erie,  
Sandusky, Ohio  
Headquarters—The Breakers  
Aug. 24-27, 1926

Electrical Supply Jobbers Association, Pacific  
Division—  
Annual Convention  
Empress Hotel, Victoria, B. C.  
Sept. 7-9, 1926

American Institute Electrical Engineers—  
Pacific Coast Convention, Salt Lake City, Utah  
Sept. 7-10, 1926

Rocky Mountain Division, N.E.L.A.—  
and  
Colorado Public Service Association—  
Joint Convention, Glenwood Springs, Colo.,  
Sept. 13-16, 1926

California Electragists—  
Annual State-wide Meeting—Hotel Del Monte  
Del Monte, Calif.  
Oct. 1-3, 1926

**CONNECTING AND TESTING DIRECT-CURRENT MACHINES**

By F. A. Annett, assistant editor of Power, and A. C. Roe, industrial and insulation engineer, renewal parts engineering department, Westinghouse Electric & Manufacturing Company. First edition, 1925, 237 pages, 172 illustrations. McGraw-Hill Book Company, Inc., New York. \$2.50.

Reconnecting d.c. machinery is a subject upon which little has been written. This book constitutes a welcome contribution to that field. Two distinct parts comprise the book. One part deals with the reconnection of d.c. machinery to accommodate a change in voltage or speed or both. The other part covers the locating and remedying of faults.

Rules and principles governing the changes made in windings to accommodate new conditions are treated in the first section. What is of even more importance to the practical worker is the explanation of the methods of applying these rules. Actual reconnection problems are treated and many wiring diagrams are given. Discussions on types of windings, taking armature rewinding data, types of armature coils, reconstructions and changes, and the computation of new windings for old machines follow in logical sequence.

Problems incident to the location and correction of faults are treated in

the second section. The subject is treated not only from the practical side to show how tests are made, but the reasons for certain definite test methods are given. Care is taken to explain why certain results may be expected. Standard diagrams are used for illustrations. Short circuits, open circuits, grounds, and reversed coils are treated in separate chapters. Other chapters are devoted to the construction and use of an armature-testing magnet, field-coil checking, and field-coil faults.

E.R.S.

Turbines. Serial report of the prime movers committee of the Technical National Section, N.E.L.A. This is a delayed report of the 1924-25 committee. It is a review of the characteristics of the outstanding turbine installations made during that year, and uses the review as a basis upon which to evaluate present-day tendencies in turbine design. Investigation is made into the costs of the special designs of turbines and the allocations of these costs.

Possible modification in design that would increase ratings and tend to reduce turbine costs are pointed out. Statements are included concerning the operation of several specific installations of turbines, including the mercury vapor units at Hartford, Conn., and eight large turbines in Paris, France.

**Meetings**

Edison Employees at Long Beach, Calif., Give Entertainment.—The employees of the steam generating department of the Southern California Edison Company, Long Beach, Calif., recently held an entertainment in the Chamber of Commerce auditorium. The program was opened by Helen Hine-man of the Edison office in Montebello, who impersonated Busy Buttons, the company's little page-boy. G. Haven Bishop, the company's photographer, presented a two-reel comedy. Music and several specialties were furnished by the Shell Company orchestra, and the Shell quartet. Dancing was the chief diversion the latter part of the evening.

Electric Club to Continue Holding Meetings During Summer.—The Electric Club of Los Angeles has voted to continue holding weekly meetings during summer months without interruption. In previous years the club recessed during the three summer months.

Westinghouse Company Holds Annual Meeting.—At the annual meeting of the Westinghouse Electric & Manufacturing Company held recently at East Pittsburgh the following directors whose terms had expired were re-elected: F. A. Merrick, vice-president and general manager, Westinghouse Electric & Manufacturing Company; R. B. Mellon, president, the Mellon National Bank, Pittsburgh; George M. Verity, president, the American Rolling Mill Company, Middletown, Ohio; and Jerome J. Hanauer, of Kuhn, Loeb & Company, New York.

## Personals

Nathan A. Bowers, associate editor of Engineering News-Record, has received the degree of Doctor of Philosophy from Stanford University. Particular significance attaches to the



NATHAN A. BOWERS

award in that this is the first time a civil engineer has received that degree from Stanford. Mr. Bowers submitted as part of the requirements a thesis on "Engineering Failures in the Water Power Field." Beginning with the reservoir and giving attention to dams, tunnels, penstocks, valves, control apparatus, hydraulic turbines and draft tubes, the scope of the study extends from point of diversion to tailrace. The subject chosen was particularly appropriate because during sixteen years of editorial work Mr. Bowers has specialized on hydroelectric developments and has had unusual opportunity to investigate personally accidents and breaks in that field. To this personal experience and to data secured at first hand from other engineers Mr. Bowers added much authentic data on failures gathered through an exhaustive review of English and foreign technical publications. An arrangement was made with Stanford University whereby the thesis will not be made public, thus making it possible to include much confidential data not heretofore released and assembled for collective study. Mr. Bowers joined the staff of Engineering News-Record in New York in 1910. Two years later he was transferred to Vancouver, B. C., to represent the paper editorially in the Pacific Northwest, and in 1914 was made Pacific Coast editor of McGraw-Hill publications with headquarters in San Francisco. As part of this assignment he served as Pacific Coast editor of Electrical World from 1914 to 1919. In addition to other duties, Mr. Bowers found time to be secretary-treasurer of the San Francisco Engineering Council for two years, and for about five years filled the same position in the local section of the American Society of Civil Engineers. He is now first vice-president of the San Francisco Engineers' Club. Mr. Bowers, a

native of California, was graduated in civil engineering from Rose Polytechnic Institute, Terre Haute, Ind.

R. E. Cunningham, formerly operating electrical engineer, Southern California Edison Company, Los Angeles, has ended an association with that company that began in 1902 by resigning to go into business for himself. Mr. Cunningham has entered into partnership with Charles Farnham, who has been handling a number of lines of electrical equipment in Los Angeles for about twelve years, and the firm will be known as electrical and sales engineers.

Chester Coon, whose hot line tools made for use upon the lines of the San Joaquin Light & Power Corporation, Fresno, Calif., have aroused interest, has left the latter company to engage in the manufacture of "hot tap" tools at Oakland under the trade name of Safety Live Line Tool Company. Mr. Coon was a member of the San Joaquin company's organization for seven years, starting as lineman.

L. N. Robinson, of the engineering department of Stone & Webster, division of construction and engineering, lately left Seattle to enter the engineering section of that company's Boston organization. For the past three years Mr. Robinson has been engaged in the development of the Puget Sound Light & Power Company's Baker River project.

Sam G. Hepler, president, The Arrow Electric Company, Seattle, has been elected president of the Mutual Business Club of that city. Mr. Hepler is also a prominent member of the Electric Club of Seattle.

W. A. Knost, sales manager of appliance division, Illinois Electric Company, Los Angeles, not long ago paid a visit to San Francisco.

L. A. Nott, San Francisco manager for the Sangamo Electric Company, Springfield, Ill., visited the Northwest a short time ago.

E. L. Hughes, for several years assistant superintendent of the electric department, De Sable division, Pacific Gas and Electric Company, has been transferred to the San Francisco general office where he will take up new duties in the electric construction and operating department. W. G. Whitney, formerly an office assistant in the department of electric construction and operation, has been appointed to succeed Mr. Hughes.

C. D. Weiss, superintendent of transportation and stores, San Diego Consolidated Gas & Electric Company, has been appointed a member of the executive committee of the San Diego Chapter, American Red Cross, for the ensuing year.

J. McA. Duncan, for fourteen years Pittsburgh district manager, Westinghouse Electric & Manufacturing Company, has been promoted to assistant general sales manager of that company. W. R. Marshall, formerly branch manager at Buffalo, succeeds Mr. Duncan. Roscoe Seybold, who has been manager of price statistics for the company, has been made assistant to F. A. Merrick, vice-president and general manager.

M. K. Pasco, sales manager, Armstrong Manufacturing Company, Huntington, W. Va., who has been making a tour of the West recently visited Los Angeles en route to the P.C.E.A. convention in that city.

J. D. Ross, superintendent of the Seattle Municipal Light Department, recently spoke before the American Association of Engineers on lighting, comparing the Seattle lighting system with that of Eastern cities which he recently visited.

George B. Sanford, formerly division manager at Sacramento, Calif., for the Great Western Power Company, San Francisco, has been appointed secretary and assistant treasurer of the Grays Harbor Railway & Light Company, Aberdeen, Wash., succeeding A. B. Doerr, resigned.

H. B. Sewell, district manager in Bellingham, Wash., for the Puget Sound Power & Light Company, recently returned from Boston, where he attended a convention of Stone & Webster managers.

W. A. Slater, engineer physicist of the Bureau of Standards, under whose supervision tests of the experimental arch dam built under the auspices of Engineering Foundation on Stevenson Creek, near Fresno, Calif., are being conducted, has been made chief of the division of concrete and masonry construction of the Bureau of Standards in Washington, D. C.

John B. Gray, who for many years has been chief clerk in the operating department of the Southern California Edison Company, has been transferred to the employment department of the company as assistant supervisor of employment.

John A. Laing, vice-president, H. S. Gray, attorney, and H. H. Schoolfield, chief engineer, Pacific Power & Light Company, Portland, recently visited Spokane to confer with officials of the Clearwater Timber Company and Northern Pacific Railway Company concerning the joint timber and power development on the Clearwater River at Lewiston, Idaho.

R. C. Mixer, for the past six years owner and operator of the Mixer Electric Company, Lodi, Calif., has rejoined the San Francisco organization of the General Electric Company, being affiliated with the merchandising department. Mr. Mixer formerly was associated with that office prior to engaging in business for himself.

E. R. Owen, in charge of the Logan division of the Utah Power & Light Company, Salt Lake City, was the principal speaker at a meeting of the Logan Kiwanis Club a short time ago.

W. J. Morris, purchasing agent, Portland Electric Power Company, and A. W. Angell, purchasing agent, Northwestern Electric Company, and J. R. McCalm, Fobes Supply Company, all of Portland, attended the annual convention of the National Association of Purchasing Agents, held in Los Angeles early in June. Mr. Morris is vice-president, and Mr. Angell a director of the national association.

J. R. King, telephone specialist of the Graybar Electric Company in Seattle, went to New York for the first nation-wide convention of the company's trade specialists that opened a four-day session in that city recently. This is the first conference of these specialists since the company was founded fifty-seven years ago.

E. H. Snissen, assistant vice-president of the Westinghouse Electric & Manufacturing Company, has been spending four weeks in the Los Angeles territory.

Sir Aubrey Brisco, electrical engineer, recently returned to San Francisco to make his residence after spending three years in England.

F. B. Kniskern, circuit breaker engineer, supply engineering department, and J. Boden, inspector, circuit breaker department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, recently spent considerable time at the Vaca-Dixon substation of the Pacific Gas and Electric Company conducting tests on the 220-kv. Westinghouse breakers installed at that point. In conjunction with these tests, S. B. Griscom, general engineering department; C. F. Wagner, insulator and transmission engineering department, and O. B. French, oscillograph operator, engineering laboratory, of the Westinghouse company's Pittsburgh organization, have been engaged in making some transmission stability tests on the 220-kv. transmission lines.

H. G. MacDonald, circuit breaker engineer, supply engineering department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, recently spent some time in Los Angeles in negotiation with the Southern California Edison Company and the Bureau of Power and Light regarding heavy-duty high-tension circuit breakers.

George L. Myers, assistant to the president; H. H. Schoolfield, chief engineer; George C. Sawyer, sales manager; W. T. Neill, superintendent of rates and service; S. E. Skelley, manager investment department, and V. H. Moon, appliance sales superintendent, were among those from the Portland office of the Pacific Power & Light Company who attended the convention of the Northwest Electric Light and Power Association at Spokane in June.

Dexter S. Kimball, dean of the college of engineering, Cornell University, while in attendance at the Spring Meeting of the A.S.M.E., in San Francisco, addressed the members of the San Francisco Electrical Development League on "An Engineer's Prophecy."

D. E. Harris, president, Pacific States Electric Company, San Francisco, is making an extensive Eastern trip.

A. C. McMicken, sales manager, Portland Electric Power Company; Norwood W. Brockett, manager public relations, Puget Sound Power & Light Company; J. H. N. Adams, advertising manager, Mountain States Power Company, Tacoma; D. L. Scott, manager public relations, Los Angeles Gas and Electric Corporation, and H. K. Griffin, commercial agent, Western States Gas & Electric Company, were among the utility men who attended the sessions of the Pacific Coast Advertising Clubs Association convention in San Francisco the early part of July.

Harrison Smitherum, assistant engineer of the California Division of Water Rights, has been appointed water master for Shasta Valley for 1926 by Edward Hyatt, Jr., chief of the division. Mr. Smitherum was water master for Shasta Valley in 1924.

Dwight Ware of the Securities Company of the Puget Sound Power & Light Company, Seattle, recently returned from a convention of Stone & Webster managers at Norfolk, Va.

E. G. McCann, president of the San Francisco Electrical Development League, was a visitor to the Electric Club of Los Angeles recently while in that city.

Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany, Ore., recently talked before the Commercial Club of Independence, Ore., on the proposed hyroelectric bill in Oregon and also discussed the use of electricity in Oregon agriculture.

Hylon T. Plumb, engineer of the Salt Lake City branch of the General Electric Company, has been given an honorary degree of bachelor of science by Milton College. Mr. Plumb delivered the commencement address at that institution.

D. C. Green, vice-president and general manager of the Utah Power & Light Company, Salt Lake City, has been elected a member of the board of governors of the Chamber of Commerce of that city.

C. E. Stewart, engineer of the General Electric Company of Schenectady, recently addressed the Engineers Club of Seattle on "Supervisory Systems for Control and Indication of Power Apparatus."

E. H. Lytle, of the British Columbia Electric Railway Company, Ltd., Vancouver, has been promoted to have charge of the company's information bureau, succeeding A. E. Chamberlain, who has left the company.

Donald B. Ocamb, formerly with the Pacific Telephone & Telegraph Company, San Francisco, has joined the Graybar Electric Company's organization as a telephone specialist. Mr. Ocamb succeeds A. C. Brunner, who has resigned to become affiliated with the Western Equipment Supply Company, Manila.

R. L. McLellan, managing director of the Cia Westinghouse Electric Internacional, S. A., of Argentine, recently has been elected president of the United States Chamber of Commerce of Argentine.

H. M. Towne, of the General Electric Company of Pittsfield, Mass., was a visitor to the Electric Club of Los Angeles not long ago as the guest of J. H. Cunningham of the General Electric Company of Los Angeles.

Ernest L. Dee, sales manager of the Edison Lamp Works of the General Electric Company in Salt Lake City, left recently to attend a meeting of the sales managers of the company in Harrison, N. J. From there he went to Association Island to attend the meeting of engineering, manufacturing and division sales managers of both the National and the Edison Lamp Works.

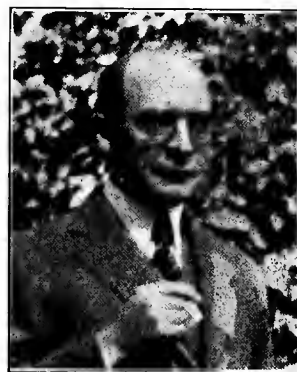
A. E. Vieu and Ernest F. Granzow, of the Crouse Hinds Company of Denver, and George O. Hodgson of the Edison Lamp Works of Denver, were in Salt Lake City not long ago on a business trip.

P. M. Parry and George B. Thomas, of the Utah Power & Light Company, were the representatives from Salt Lake City to the recent National Electric Light Association convention in Atlantic City.

George Rucker, Pacific Coast manager of the Holophane Company, paid a visit to Denver on his way east to the Holophane Company's plant at Newark, Ohio, for a recent sales conference.

C. V. Allen, formerly assistant treasurer, Westinghouse Electric International Company, has been promoted to the post of treasurer and assistant secretary, succeeding H. A. Carmichael, resigned.

E. A. Phinney, president and general manager, The Jefferson County Power & Light Company, Golden, Colo., will serve as general convention chairman of the combined conventions of the Rocky Mountain division of the National Electric Light Association and the Colorado Public Service Association to be held in Glenwood Springs, Colo., in September. This will be the third time that he has acted in that capacity, having been general chairman at both the 1924 and 1925 conventions. Mr. Phinney is very well



E. A. PHINNEY

known in the electrical industry in the Intermountain region and always has given freely of his time and energies in its activities. From 1905 until 1914 he was president and secretary of the Ouray Electric Power & Light Company, Ouray, Colo., from 1910 until 1914 president of the Ridgway Electric Company, and president of the Montrose Electric Light & Power Company and the Delta Electric Light Company from 1912 until 1914, when all four companies were sold to the Western Colorado Power Company. In 1915 he purchased the property of the Golden Illuminating Company, changing the name to The Jefferson County Power & Light Company, and has been president and general manager since that time. Mr. Phinney is an ex-president of the Rocky Mountain division of the N.E.L.A., having occupied that position for the 1920-1921 term.

R. M. Alvord, district manager for the General Electric Company in San Francisco, recently departed on a trip to Schenectady, N. Y., the head offices of the company.

## Obituary

Charles E. Scribner, for twenty-three years chief engineer of the Western Electric Company, New York, and for six years prior to his retirement consulting engineer, died at Jericho, Vt., June 25. With the exception of Thomas A. Edison, whose life-long friend he was, Mr. Scribner was credited with holding more patents in the electrical field than any other inventor. The first multiple switchboards to be used commercially were of his design.

## TRADE NOTES

**Safety Live Line Tool Company, Inc.**, 223 Fifth Street, Oakland, Calif., is the name Chester Coon, for the past seven years a member of the San Joaquin Light & Power Corporation's organization, has given to the company he has formed to manufacture "hot tap" tools. These live line tools permit high-tension distribution lines to be worked "hot" with perfect safety to line crews, according to the company. Complete information or demonstration by a company representative will be furnished upon request.

**The Hart & Hegeman Manufacturing Company**, Hartford, Conn., has issued a new catalog which is just off the press. Many changes have been made in the book. List prices and standard package quantities have been brought up to date. The catalog shows the company's complete wiring device line as well as a line of new products added to its stock, among them fish switches, snap switches, canopy switches, adjustable candle sockets and canopy receptacles, combined tumbler switches and receptacles. The catalog is known as "S" and is now available to anyone upon request.

**The Electric Controller & Manufacturing Company**, Cleveland, O., has developed a completely self-contained, oil-immersed automatic starter for 2,300-volt synchronous motors. This is built for across-the-line starting of slow-speed motors and for reduced voltage starting of the higher-speed motors.

**Warren Webster & Company**, Camden, N. J., have established a branch office in Salt Lake City, Utah, to serve the requirements of their customers in Utah, southeastern Idaho and eastern Nevada. **Rushby C. Midgley** has been appointed district manager.

**The Perfeclite Company**, 422 Fourth Avenue, Seattle, has purchased through receiver's sale patents and other assets of the late Masters Fixture Company of Auburn, Wash. The Seattle concern has entered into an arrangement with a group of Auburn men, headed by G. C. Lang, to manufacture the electric light shades and other fixtures formerly made by the Auburn concern.

**Hotchner Brothers**, manufacturers of electric signs, have recently moved into their new home, corner Eighth and Howard Streets, San Francisco.

**The Corning Glass Works**, Corning, N. Y., has entered the electrical transmission field with high-tension Pyrex insulators. At present the company is offering pin-type insulators of a one-piece design for operating voltages from 6,600 to 50,000. Development work is proceeding on suspension and flange or stack-type units, and further announcements will be made later. **Raymond W. Lillie** is manager, with offices at 501 Fifth Avenue, New York City.

**Packard Electric Company**, Warren, Ohio, has appointed **A. J. Myers** Company, 611 Howard Street, San Francisco, exclusive agent for the state of California north of Fresno and the entire state of Nevada.

**The Cecil R. Lambert Company, Inc.**, Detroit, specialists in the design, manufacture and installation of conveying and handling equipment, has changed the company name to **Mechanical Handling Systems, Inc.**, in order to identify its products and service with its name.

**Wagner Electric Corporation**, St. Louis, has issued bulletin No. 146 on Power-Factor Correction by the Consumer. This covers the experience of the American Gas & Electric Company of New York City.

**Pass & Seymour, Inc.**, Syracuse, N. Y., has developed a new porcelain ring receptacle with identified loop terminals. The manufacturer claims that it is necessary only to loop the wires under the ears of the terminal which then are bent down and solder applied. When this terminal is coated with the usual insulating wax or compound, it makes a reliable mechanical and electrical connection.

**George Richard & Company**, Chicago, have placed on the market a new bell-ringing transformer, which is designed for residences and small apartments. It is made to lie flat against the wall, which permits mounting in boxes, thereby saving considerable time in installation. The transformer is manufactured in both single-circuit secondary and three-circuit secondary. The single-circuit delivers 8 volts on the secondary side. The three-circuit secondary type delivers 6.12 and 18 volts, respectively, when installed.

**The Chicago Flexible Shaft Company** has appointed **B. A. Graham**, formerly its Western representative with offices in San Francisco, sales director of its appliance department with headquarters in Chicago. Mr. Graham will assume direct control over the sales of the company's electrical appliances and devote particular attention to the Sun-beam iron which it manufactures.

**Tork Company**, New York City, has issued a pocket booklet containing descriptions of the Tork clocks for controlling store window lights, electric signs, traffic signal lights, floodlights, street and park lights, apartment house hall lights; also for controlling automatic oil burners, buckwheat coal burners, alarm systems and advertising machines. Photographs and price lists are included in the booklet.

**Farnham & Cunningham** is a recently formed Los Angeles engineering firm. **R. E. Cunningham**, formerly connected with the Southern California Edison Company, Los Angeles, and **Charles Farnham**, who has been handling electrical equipment lines in Los Angeles for about twelve years, have entered into a partnership as electrical and sales engineers. The firm, whose address is 307 South Hill Street, Los Angeles, will represent **Schweitzer & Conrad, Inc.**, **G. & W. Electric Specialty Company**, the **McCormick Lumber Company** and others.

**Fred W. Williams**, Santa Maria, Calif., has invented a fuse, plug having six fuses in one base so that the necessity of making a replacement with an entirely new plug each time a fuse wire is burned out is eliminated. When a fuse wire burns, all that is necessary to place another fuse wire in the circuit is to turn the top of the fuse to the next position. The fuse has a mica face so that the particular fuse wire which is burned out may be seen at a glance as well as the number of wires left in a fuse.

**Rollin Smith Engineering Company**, Los Angeles, has opened an office in San Francisco at 519 New Call Building, 74 New Montgomery Street.

**Pittsburgh Transformer Company**, Pittsburgh, has issued bulletin No. 2055, on the Pittsburgh transformer tap changer, which consists of a switch mounted above the coils of the transformer and made a part of the terminal board. The construction and operation of the switch are illustrated in the folder.



Keeping it in the family, with a vengeance. The two people who know more about electric cooking than any others in the country perhaps decided to make it one. Now when Ray Turnbull, Pacific Coast sales manager of the Edison Electric Appliance Company, comes home from a round of golf he gets a home demonstration in electric cooking from Carol Dangler Turnbull, home economics specialist for the Edison Electric Appliance Company. News of the marriage of this supreme combination in electric cookery came as a surprise to friends of the couple at the recent Northwest Electric Light & Power Association convention in Spokane.



# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

Here's the New  
Non-Metallic  
Sheathed Cable

Another  
**Durabilt**  
Product



## DURAX

REG. U.S. PAT. OFF.

NON-METALLIC SHEATHED CABLE

Made by the makers of  
DURABILT PRODUCTS

Tubular Woven Fabric Company  
Pawtucket, R. I.

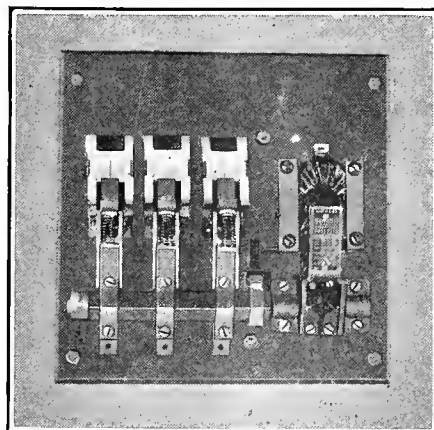
*Dura Bill sees  
profitable times ahead  
for users of DURAX*

*Pacific Coast Representative*  
**ALLIED INDUSTRIES INC.**

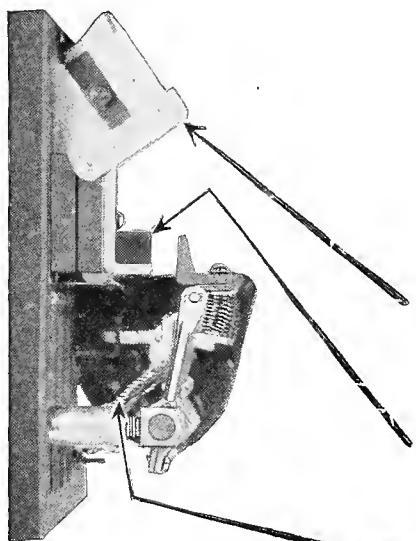
455 Second Street, San Francisco  
305 Ninth Street, Oakland  
1256 Factory Place, Los Angeles  
53 Fourth Street, Portland  
532 1st Ave., South, Seattle

# Across the Line A. C. Starter—Bulletin 6000

## Rugged and Dependable—Note Features



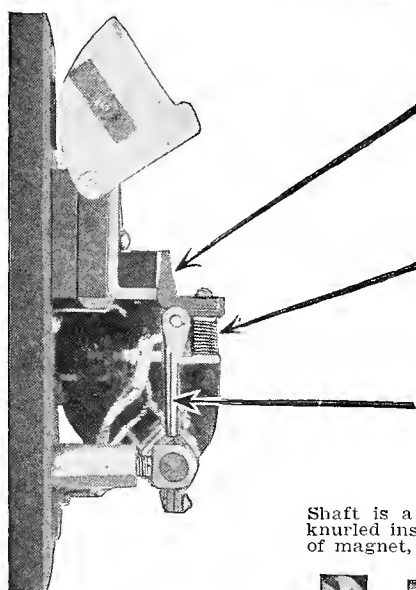
Since the very beginning Sundh has been the pioneer and leader in A.C. magnets and in Controllers of Multiple Contacts. This new A.C. starter is no exception.



The arc shields being pivoted can be swung up out of the way for inspection or replacement of stationary contacts.

Stationary contact is composed of a carbon block and a copper angle bolted together and ground to accurate finish and mounted on pure Bakelite extension blocks.

Two braided copper leads—under each lever out of the way.



Movable copper contact—affords wiping action against carbon and final rolling contact on the copper. This contact is solid pure copper  $\frac{1}{2}$  in. in width,  $1\frac{1}{2}$  in. in length and  $1\frac{1}{2}$  in. thick, conservatively rated for 50 amp. continuous. This contact is produced by a strong helical spring acting at all times. This spring is also insulated from all heat produced by the contact.

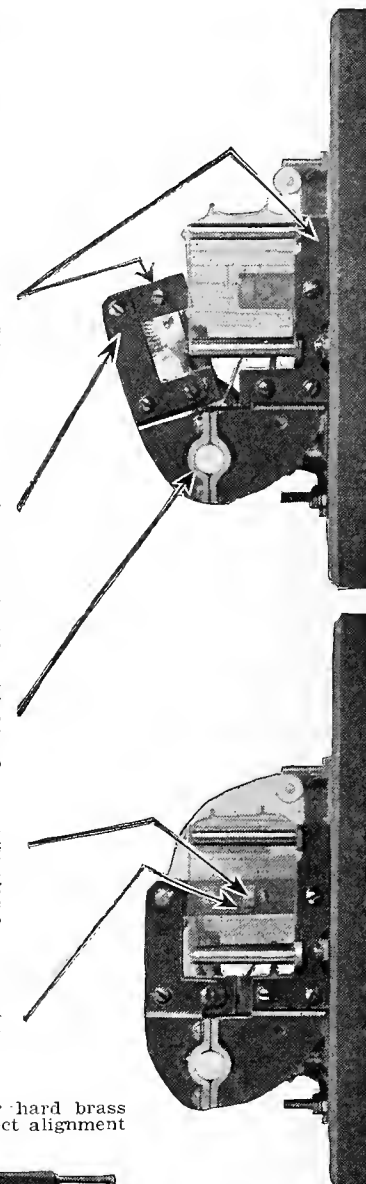
Lever is made of two heavy brass punchings bolted together over insulated square shaft.

Main magnet frame and movable armature are composed of thin, accurately punched laminations and securely bolted to heavy punched iron frames.

Movable armature is located and clamped to square insulated shaft which pivots in rugged  $\frac{1}{2}$  in. diameter by  $\frac{5}{8}$  in. long bearings. This bearing is a brass shaft, pivoting in an iron bearing. It cannot rust together and on account of size its wear is practically nil. Bearing caps, being removable, permit the taking out of the shaft with armature and contact levers assembled, facilitating ready inspection of the pole pieces and making it convenient to change magnet coil.

The magnet is so designed that the poles meet half way in the coil, which affords maximum pulling power, throughout entire range from full open to full closed position.

The faces of pole pieces are accurately ground with secondary coil inserted eliminating all noise.



Shaft is a pure Bakelite moulding with a rugged  $\frac{1}{2}$  in. diameter hard brass knurled insert;  $\frac{5}{8}$  in. shaft is of the square type which affords perfect alignment of magnet, levers and movable contacts.



SUNDH ELECTRIC COMPANY, NEWARK, N. J., U. S. A.

### THE DEMMERT CO.

106 West 3rd St., Los Angeles  
74 New Montgomery St., San Francisco

Gentlemen: Please send me Sundh's booklet on A. C. Starters.

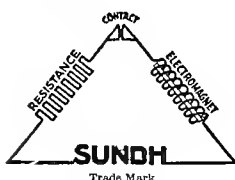
Name .....

Address .....

City and State .....

Company .....

Position .....



# Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."  
Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication  
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B. H. SNOW, Northwest Editor

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NUMBER 3

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## What's a Hundred Years?

THE first hundred years are the hardest, even for editors. Witness the following letter commenting upon a mistake that happens in the best of editorial families:

To the Editor:

Sir: Please refer to page 23 of your issue of July 15, 1926, to the article headed "Subscription Paid to Year 2226."

In the last paragraph of the letter that you quote from the New York Steel Exchange, Inc., it says "your advertisements would pay our subscription well into the twenty-second century." That is surely a compliment, but why not be satisfied with it instead of jumping it ahead one hundred years.

Question: Is not the year 2226 in the twenty-third century?

F. F. SPRINGER.

San Francisco, Calif.  
July 26, 1926

It is no more than fair to state that the mathematical lapse to which Mr. Springer refers is attributable to the editors and not to Mr. Lamb, who is a distinguished engineer and obviously a mathematician incapable of error so flagrant. Possibly the probability of a complete change in the editorial staff at some time prior to the date Mr. Lamb names accounts for the lack of interest on the part of the editorial staff in establishing the date of the expiration of Mr. Lamb's subscription.

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New York

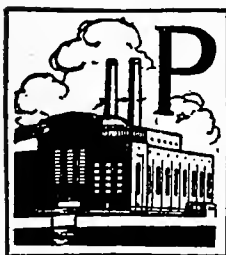
Publishers of  
American Machinist—European Edition  
(Published in London)  
Industrial Engineer

Electrical Merchandising  
Chemical and Metallurgical Engineering  
American Machinist  
Successful Methods  
Electrical World  
Electric Railway Journal  
Engineering and Mining Journal  
Bus Transportation  
Engineering News-Record  
Coal Age  
Radio Retailing  
Power

# EXPENDED FOR GROWING UTILITIES

Over \$100,000,000 a Year Backed by  
Stone & Webster Experience

## Pioneers for 37 Years



**P**UBLIC UTILITIES are successfully meeting a huge and fast-growing demand for electric light, power and transportation. Practically as old as the industry itself, the Stone & Webster organization has kept even pace with the extraordinary expansion of the utilities

for thirty-seven years.

## Expenditures \$100,000,000 Yearly

Over \$100,000,000 yearly is expended through the Stone & Webster organization for public utilities construction, maintenance and operation. These activities extend into nearly every important State. The home office directing the financing, construction and operation of properties numbers 1500 people and occupies three acres of offices.

## Operating Managers for 60 Companies

Stone & Webster provides executive management for sixty separate public utility corporations. The record of these properties is an accurate measure of Stone & Webster operating, engineering and financial skill.

During the war the strength and soundness of the utilities was severely tested. The Stone & Webster companies achieved notable results in maintaining both their physical condition and their record of dividends.

The Charles A. Coffin Medal—awarded to the company contributing most to the development of

electric transportation—recently was won by a Stone & Webster property.

Stone & Webster service is in demand the country over. These facts show its value.

## Construction 2 $\frac{3}{4}$ Million Horse Power Reports on \$5,500,000,000

Stone & Webster has examined and appraised properties to the total value of five and one-half billion dollars, including many of the country's foremost public utilities.

Its construction of power stations aggregates 2,750,000 horse power. The systems fed wholly or in part by these stations serve a population of 15,000,000—twice the population of New England. This includes 7,000,000 served by systems receiving power from Stone & Webster-built hydro-electric plants.

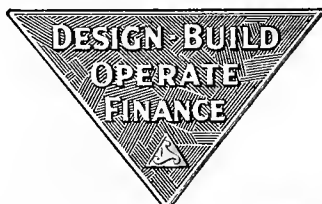
Power construction work in progress is a half million horse power. Three-quarters is for old customers who have learned that Stone & Webster-built stations pay dividends. This is because of the economy for which they are famous, and also because Stone & Webster knowledge based on actual experience of operating sixty widely-distributed utilities is available for extending old systems or planning new ones.

## For Investors

The Securities Division of Stone & Webster rounds out and completes the organization's intimate contact with the public utilities industry. Through its operations in financing properties and handling their securities it provides thousands of individuals and institutions with favorable opportunities to invest their funds in electric light, power and transportation—fundamental necessities of modern life.

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INCORPORATED



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SAN FRANCISCO: Holbrook Bldg.  
PITTSBURGH: Union Trust Bldg.  
PHILADELPHIA: Real Estate Trust Bldg.



# EDITORIAL

## Will Steam Supplant Hydro in California?

THAT the present ratio of one-third steam and two-thirds hydro which holds for the installed capacity of California will be radically changed or possibly reversed is the opinion advanced by certain engineers who have been studying closely the power situation in the state. Deficient water supply, increasing cost of hydro developments, the reaching of the possible maximum efficiency in hydraulic machine design, and most important, the increasing efficiency of steam-power generating equipment are among the reasons to which this change is ascribed.

The situation was commented upon by H. A. Barre, executive engineer, Southern California Edison Company, in a paper before the recent meeting of the A.S.M.E. which was published in the last issue of the Journal of Electricity. Mr. Barre pointed to the Long Beach and Seal Beach steam plants where efficiencies of 425 to 450 kw-hr. per bbl. of oil have been obtained. With present fuel costs, he stated that further development of stream-flow hydro plants is practically out of the question and that even projected storage hydro plants must be scrutinized carefully as to cost. Only a change of several hundred per cent in the cost of fuel can change this situation, in his opinion. His statements are borne out, moreover, by the recent announcement of his company of a projected steam plant with an ultimate capacity of 600,000 hp. which will be used as a base plant rather than for standby as has been the practice in the past with California companies operating largely with hydro.

Obviously Mr. Barre's statements will be considered radical by many engineers in a section of the country where for years white coal has been king. Careful thought, however, indicates otherwise. As has been said before, the majority of the hydro power sites economically feasible have been or are being developed. Efficiencies of 85 to 90 per cent of the theoretical have been obtained in water wheels, and there is little opportunity for improvement here. A cycle of comparatively dry years has placed added emphasis on steam plants. Foremost of all, there has been an increase in the efficiency of steam generating equipment ranging between three and four hundred per cent during the past decade. Is it not reasonable to believe that even greater efficiencies will be achieved during the next decade?

Many of the Western states abound in low-grade coal which can be utilized either in pulverized form, as has been done successfully in Washington and Colorado, or can be subjected to low temperature

distillation and burned in the form of coke and gas. Even California has extensive fields of lignite, and transportation facilities are such that cheap coal can be brought from Utah, Arizona, New Mexico or Washington.

In the face of these facts it is reasonable to look for an increase in steam-plant construction in the near future. Whether steam will supplant hydro in supremacy is a debatable subject, but certainly conditions point to a decided swing of the pendulum toward steam.

## Architects and Builders Should Be Urged to Adopt Red Seal Minimum Standards

WITH 272 Red Seal homes reported by the various subdivisions of the California Electrical Bureau covering the period between Feb. 1 last and July 1, that organization is doing a fair job, as compared to other sections of the United States, but it is no more than fair. As a matter of fact, the results are disappointing to the Advisory Committee of the Bureau, which confidently expected more than double the homes that have been reported thus far.

At the last meeting of the committee that was held at Los Angeles just prior to the Pacific Coast Electrical Association convention much discussion took place as to ways and means of bringing about better results than had been obtained thus far. The consensus of opinion as finally expressed was that (1) a public demand for the higher standards of adequacy as provided by the Red Seal plan must be created; (2) this could be brought about only through the medium of consumer-advertising on a state-wide basis; (3) since the funds available were inadequate for this task, means would have to be provided through the allocation of newspaper and other space now being used by the power companies, space in the power-company house organs, and by direct-mail efforts on the part of the Bureau itself; (4) when definite assurance was received as to what could be accomplished by (3), an advertising manual should be prepared showing the type, style, and quantity of advertising coverage for circulation among builders and architects in order that they might be persuaded to (5) agree to adopt the Red Seal minimum standards of adequacy, specifying them in all their house-wiring jobs, in order to tie in with the public demand that would be created by (3); and (6) the entire force available in the Bureau organization should bend every effort to follow up the work by personal solicitation among builders and architects in order to bring about a

proper fulfillment of its duty to those who are supporting it financially.

The Bureau advertising committee, headed by A. H. Nicoll, is preparing the work called for under (3). In the meantime there is no reason why the personal solicitation described under (6) should not be undertaken at once. The specification of Red Seal standards by the architect and builder is the solution of the problem, and now is the time to go actively to work to bring this about.

### Bitterness Should Have No Place in Industry's Arguments

**N**EEED a man be called a "demagogue," a "politician" or a "radical," to use some of the terms popularly applied, simply because he attacks the electrical industry? In a recent public pronouncement, Franklin T. Griffith, former president of the N.E.L.A., urges that the industry give credit to the authors of such attacks for at least a measure of sincerity. In discussing one such, Mr. Griffith said:

"It is a mistake that we should, when we find people expressing opinions of that sort, immediately conclude that there is some ulterior motive for the pronouncement. It is a mistake to believe that there is a lack of sincerity on the part of the proponent, and I say that if we have a lack of belief in their sincerity it inevitably will bring about a feeling on their part of a lack of sincerity on ours. . . . We do not get anywhere by cursing the man who does not have the same opinion as ourselves. We must by force of our argument and the strength of our cause convince him that we are right."

Condemnation and bitterness have no place in combating the arguments of those who do not agree that the present scheme for the development and distribution of electric energy is the wisest, best and most sane. By employing methods that fall in the class of mud-slinging the industry is doing itself more harm than good. Even the soundest and best arguments will fail to win a point if they are backed up by a heavy club.

### Storing Water Is Storing Kilowatt-Hours

**A**S the farmer who grows hay oftentimes buys hay to supply his stock until such time as his growing hay is ready for harvest and perhaps sale, so interconnection of power lines and the exchange of power from one company to another is advantageous to all concerned—this is the interesting comparison made by the San Joaquin Light & Power Corporation in one of its recent advertisements. This thought opens up possibilities for power exchange which have been little considered in the past.

When indications point to a dry year, such power companies as rely largely upon hydro for power might do well to start buying power early in the season from some more fortunately situated neighbor power company. In this way the draft upon

their own water facilities could be lightened, and when late summer arrived there still would be a supply of water, stored over the spring months, to help tide over the demand. The neighbor power system itself would not have to strain to carry both loads, but could assist the short company to carry its load more normally.

Water thus held in storage amounts to the storage of kilowatt-hours of electricity. As a rule, for the farming interests which often utilize the water after it has done its work of furnishing power, this lengthening out of the water supply to extend into late summer might prove a blessing indeed.

While this idea is nothing particularly new, it treats of a phase of the subject which the industry generally has not taken into account in the past. The opportunities for economy in such a far-sighted provision for demand, the insurance of service to customers, and the smoothing out of load curve for both the short power company and the neighboring assisting company have not been given full consideration. There has been much last-minute buying of power to cover shortage due to drought, but in this suggestion lies an opportunity to conserve home resources for the peak demand, meanwhile getting additional supply from a more fortunately situated neighbor, and placing neither in strained circumstances at any time.

### Unethical Refrigeration Advertising Condemned

**W**HEN a device such as the electric refrigerator has leapt into public favor with such tremendous impetus, it is but natural that the swath cut through a more or less quiescent atmosphere should set up eddies of a disturbing character. Instead of blindly moiling about in those eddies, however, striking any head that might come their way, the refrigeration interests, including the ice men and the electric refrigeration men, have had the calmness of judgment and sheer good sense to recognize that such practices would but entangle all in needless turmoil. This is to the credit of all concerned.

A recent conference between the men representing the ice industries, manufacturers of electric refrigerators, and representatives of the electrical industry resulted in a resolution condemning unethical advertising and sales methods and urging that refrigeration be sold and not at the expense of any particular means of arriving at it. It is said that the conference was conducted frankly, that examples of unfair or detrimental advertising were cited against both sides, and that out of this housecleaning there came the determination that no one would gain and that all would lose, if such practices were continued.

There is room for both the ice company and the electric refrigerator, and the natural economic balance between the two will find itself adjusted just as similar economic adjustments have had to be made in the past. The increased attention given refrigeration is certain to bring greater demand for refrigeration of both kinds. How much better that

the two fields of activity should co-operate to achieve this end than that one should resist the other and, so resisting, impede the general movement toward better refrigeration by just that much.

Similarly, manufacturers of electric refrigerators have come to a common understanding that sales practices between them shall be upon clean ground. In the flush of anxiety to get into activity there is danger that individual salesmen or individual sales organizations may lose sight of these simple ethics. The refrigeration industry has set a standard; let its individual members hold to that standard.

### Do Not Overlook New Blood in Association Activities

**S**TAGNATION is the bane of all human endeavor. It is the inevitable result of a lack of new life, new blood, new vision or new ideas; and it occurs in organizations just as surely as it occurs in other instances.

Notable examples of the serious consequences of "ingrowing," in several Sections of the Pacific Coast Electrical Association and of the Northwest Electric Light & Power Association, are evident even to the casual observer. Stagnation is foredoomed when committee and Section chairmanships are rotated within restricted circles. This is in no wise a reflection upon the very able men who unwittingly may comprise such circles, but is a condemning feature of faulty system. Such a policy overtaxes the energy and the initiative of the few and spurns the ability and interest of others who are fully qualified to lead in and contribute to the development of the industry. From still a different angle, the most vitally important responsibility of present leaders in the industry is the development of the leaders of the future.

It is timely to offer these few words of warning to those upon whom rests the responsibility of selecting the Section and committee chairmen of both the P.C.E.A. and the N.W.E.L.&P.A. for the coming year's service. Only with the introduction of new blood and younger men will the industry benefit to the fullest extent from the work of these important organizations.

### Remarkable Range Sales Record of Puget Sound Power & Light Company

**A**RGUMENTS of those more pessimistic central-station executives that electric ranges are difficult to sell are blasted by the record achievement of the Puget Sound Power & Light Company as set forth on another page of this issue. During a sixty-day campaign this company sold 2,043 electric ranges in its district. The campaign is all the more remarkable when it is understood that the company already was serving more than 12,000 range consumers and that there were only 64,000 residential-consumer prospects to solicit. Carefully laid plans, intensive preparatory work and the closest co-operation between all factors during the conduct of the campaign were elements in its success. The industry can take a lesson from this company, particularly in learning what can be accomplished

through co-operative planning and execution—co-operation between the manufacturer and the utility company and co-operation between the sales department and other departments within the company.

### Beauty That Kills and the Electric Store

**N**ATURALLY enough, the ideal of every electrical merchandiser is to arrange his store in the most pleasing and attractive manner possible. The arts of display are exercised to the utmost of the individual merchandiser's capacity to this very end. But once in a while a merchandiser succeeds so well that his store's very attractiveness defeats its own purpose, the mundane purpose of selling merchandise.

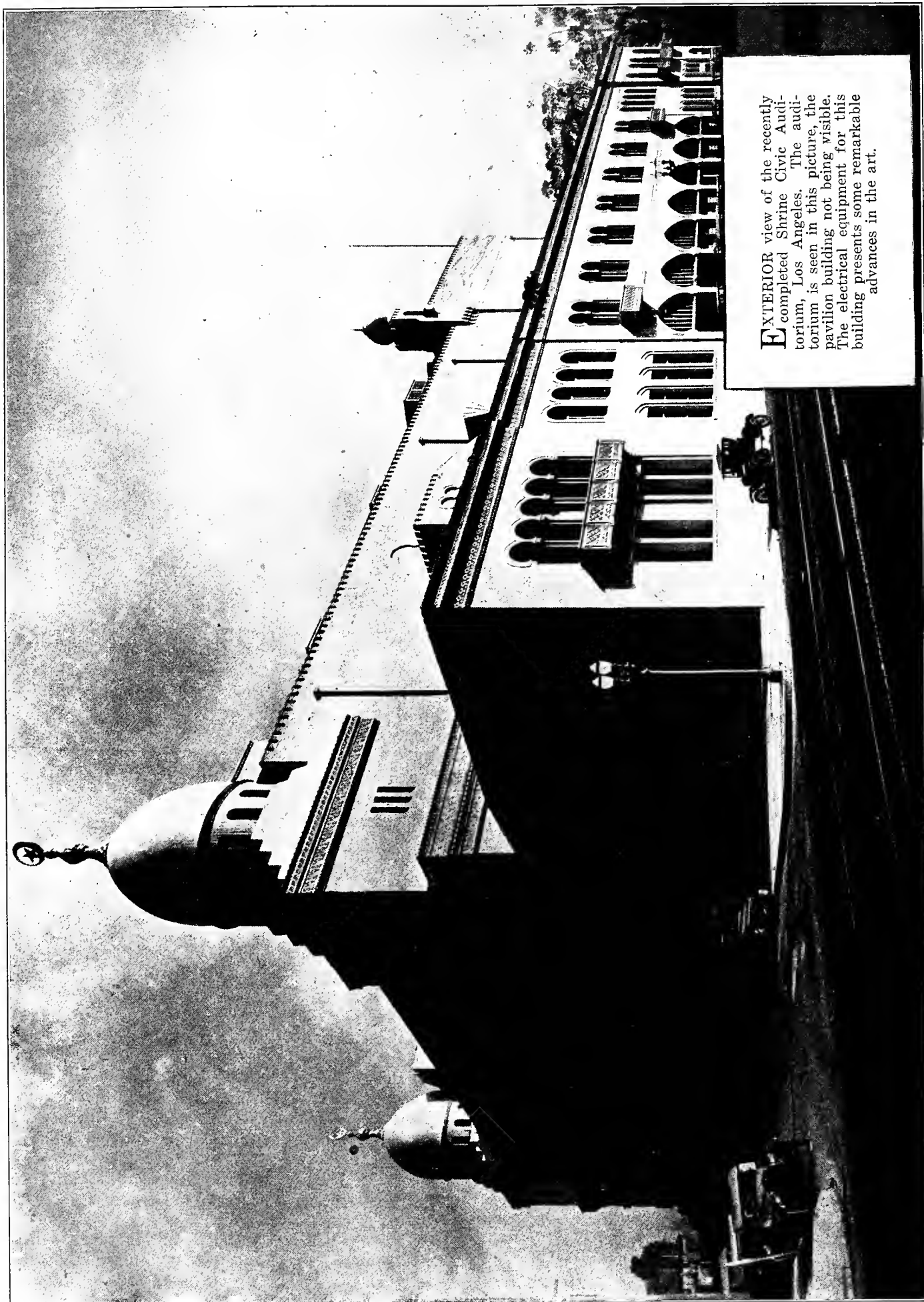
Every once in a while some particularly beautiful store is put on display. Elegance breathes from its every pore, and the photographs of it are like unto the rotogravure effulgence that the homes of the rich present to the naked eye of a Sunday morning. Its every appointment is designed with the utmost of taste and distinction, and in toto, it is the ultra of ultras.

But sometimes, ere the photographs can be published in the magazines, pointing with pride to this latest palace of electrical establishments, the place has closed its doors for lack of business. It was beautiful, but it was too beautiful. The common, ordinary mortal, he who buys merchandise, was afraid to walk across its threshold. It was too lovely. It made him self-conscious of the fact that his tie was creased or his shoes dusty.

There is danger in too much elegance, especially if one uses it as an appeal with intent to sell. If an electrical merchandising establishment by its beauty of appointments and expensiveness of aspect gives the impression that its merchandise belongs to the classification of luxury, it hurts rather than helps its sales. The buyer at once associates the merchandise displayed in too elegant a fashion with some of the accompanying rich rugs, furniture or drapes which he cannot afford, and with a sigh resigns himself to the fancy that such things are not for a mere mortal such as he.

Because electrical merchandise is anything but luxury merchandise, this impression should be guarded against. Electricity provides convenience and saves labor and time. Electrical appliances are modern machinery applied to domestic uses. Some appliances are very prettily patterned and adorned, it is true, but their uses are certainly not luxurious. They are useful first, and beautiful as a matter of course. The display of such appliances should be conducted upon the same plan.

There is, the other extreme, too, the extreme of too little care in display, too little attention to cheerful and pleasant surroundings in the merchandising store. Yet because lack of beauty or elegance is bad, too much vulgar display of wealth is not the cure for the evil. There is a nicety which must be observed in these matters, calculated upon the logical appeal to be made to those who buy merchandise, people in all walks of life.



**E**XTERIOR view of the recently completed Shrine Civic Auditorium, Los Angeles. The auditorium is seen in this picture, the pavilion building not being visible. The electrical equipment for this building presents some remarkable advances in the art.



# Electrical Equipment of the World's Largest Stage

New Al Malaikah Temple Civic Auditorium in Los Angeles  
Embodies Unique Electrical Features

By C. A. Sanborn

Holmes and Sanborn, Consulting Engineers

**R**ANKING with the great auditoriums of the world and containing one of the largest indoor stages, the Shrine Civic Auditorium recently has been completed by Al Malaikah Temple in Los Angeles. Joined to the auditorium building is a three-story pavilion building arranged to handle carnivals, fairs and exhibits, banquets and large dances, making, together with the auditorium, a group of two buildings sufficient to serve the civic needs of Los Angeles as a convention city.

The Moorish style of architecture with its distinctive features, as designed by John C. Austin, F.A.I.A., dominates the group. The buildings cover an L-shaped area measuring 294 ft. on Jefferson Street, 279 ft. on Royal Street and 564 ft. in length on the east property line and so arranged that the banquet floor of the pavilion building leads directly into the north side of the auditorium stage, making it possible to arrange pageants and processions in the banquet hall before proceeding onto the stage. Housed also in the group are the Shrine organization rooms.

## Auditorium Lighting

The auditorium, with seating accommodations for 6,442 people, has an immense stage measuring 192 x 72 ft. and having a proscenium opening of 100 ft., which is 15 ft. wider than that of the New York Hippodrome. The decorative color designs in the auditorium range from rich deep blue, reds and deep scarlet and royal purples to bright blues and soft shadings of buff and yellow, making an extremely artistic effect. The ceiling is in effect a tinted canopy with the blue sky and stars above. A double cove illuminating the sky and the canopy, with its draped folds held by huge ropes, is lighted by the main chandelier.

Reported to be the largest electric chandelier ever

**F**IFTEEN feet wider than the New York Hippodrome, the stage of the new Al Malaikah Temple Civic Auditorium is unquestionably the largest indoor stage in the world. The switchboard is the largest stage switchboard ever constructed, and the main chandelier in the auditorium is claimed by fixture men to be the largest lighting fixture ever built. In the construction of this mammoth auditorium the electrical problems presented to Holmes and Sanborn were no less mammoth. How they were handled is modestly set forth in the accompanying article.

built, this fixture weighs approximately 5 tons and has a diameter of 20 ft. and an overall length of 28 ft. The lighting is in four colors, the total load in the fixture being 65 kw. Relamping is accomplished through a trap door in the canopy ceiling above the fixture through which a ladder may be lowered.

In addition to the ceiling coves and main fixture, decorative coves in three colors are installed around the front and side walls, about 18 ft. below the main ceiling. A secondary ceiling above the orchestra pit is cove lighted in three colors, no white light being used. At the center of this

ceiling is a smaller crystal fixture also in three colors.

The soffit of the balcony is panelled to provide for ventilating grilles. In each of the seventeen panels is a fixture in four colors. The ceiling space outside the panels is provided with fixtures in white light only, to give uniform illumination during conventions.

Emergency lighting in the auditorium is provided by aisle lights which are located at every fourth row on the main floor and at every third row in the balcony.

## Stage Lighting

All of the stage lighting is in four colors. A single row footlight with 150-watt lamps wired in a sequence of red, white, amber, white, blue, white, red, etc., provides down-stage illumination. This is augmented by six banks of four 500-watt floods set in front of the balcony and 96 500-watt spot floods overhead for orchestra pit and front stage lighting. In addition to the above the stage has:

- 7 99-ft. borders using 500-watt lamps.
- 68 30-amp. incandescent pockets.
- 8 30-amp. proscenium strip pockets.
- 15 75-amp. d.c. pockets.

The first border is of the "concert type," and is equipped with four-unit suspension hoods, each unit being provided with separate leads, terminating in a screw plug for attachment to raceway outlets. There are also in the concert border 12 pin plug connectors on 12 circuits for the additional attachment of spotlights.

Due to the extreme width of the stage the ordinary type of proscenium strip lights was not desirable. Therefore a four-section pocket was provided on each side of the proscenium opening, into which portable strip lights can be plugged. The two pockets of the same color on both sides are connected to the same dimmers. Four 1,000 to 2,000-watt dimmers per color are supplied and arranged with paralleling switches to dim any wattage from 1,000 to 8,000 watts per color.

Due also to the great width of the proscenium opening, the electrical equipment was engineered



It will be seen from this view of the auditorium that no columns are used to support the balcony. The largest bridge truss known to have been used inside a building supports the balcony. The immense ceiling fixture, 20 ft. in diameter, floods the auditorium and particularly the balcony.

so as to allow a segregation of the center 50 ft. of the stage in order to provide for the ordinary show and visiting theatrical companies, which in general cannot utilize a 100-ft. opening.

The circuits and dimmers for the footlights and borders, therefore, are arranged so that either the "full proscenium" or the "short proscenium" can be used, using the same switch and dimmer handles on the switchboard for the control of lights for either opening. Each border is divided into three sections, the center one being 49 ft. long and the two end sections each 25 ft. long. Each section is hung independently of the others, allowing the raising of the two end sections when the "short proscenium" is used so as not to interfere with the sets.

As the building is located outside the downtown section, no direct current is available. A 100-kw., 3-wire, 110/220-volt direct-current generator set consisting of two 50-kw. 110-volt generators in series driven by a 150-hp., 2,200-volt, 3-phase, 60-cycle induction motor was provided, located in the

auditorium service switchboard room. This generator set provides direct current for all the d.c. arc pockets and also provides an extra feed to the projection room supplementing the generator set for projection service.

In addition to the above equipment, a 400-amp., 3-wire auxiliary lead is brought up to both sides at the rear of the stage from which additional capacity can be obtained for any effects which need not be controlled from the stage switchboard.

On the stage adjacent to the pilot switchboard is located the stage manager's station on which is mounted a return call annunciator to all the dressing rooms, curtain control equipment and signals for intercommunication telephones, one on the house system and one on the private line to the projection booth; also a return call buzzer to the projection booth and a stage ventilator control station. A desk shelf is provided for script and notes.

The stage ventilator control operates from the emergency light service and operates to close stage dampers when the circuit is broken. Operating keys are located in the box offices and the stage manager's station.

### Stage Switchboard

A Hub Electric Company pre-set, selective, remote-control stage switchboard controls all the stage and house lights. This switchboard is 26 ft. long and has 152 Locke main pilot switches and 279 Ward-Leonard dimmer plates and 147 Sundh contactors. It is the largest stage switchboard ever constructed.

### Projection Room

The projection room is located at the rear of the main floor of the auditorium and is of the latest design equipped with two projection machines, four spotlights and one stereopticon. The direct-current circuits are controlled from a switchboard arranged to throw each machine across either the d.c. service from the stage motor-generator set or across the projection room generator-set service.

Return call buzzer stations between the stage manager, orchestra leader and organ console are provided between the projection machine and spotlights. A private phone system between the stage manager and projection room is installed with three phones on the front wall of the projection room, one beside each lookout port.

A complete pilot unit for operation of the stage and house masters on the stage switchboard also is provided on the front wall of the projection room. This permits the operation of any lighting effects on the stage and house, the set-ups having been made on the stage board.

### The Pavilion Building

The three-story pavilion building has an exhibition hall and a banquet hall and is 300 x 150 ft. with a wing 120 x 75 ft. adjoining the lobby of the auditorium building.

The basement of the wing is used for boiler and fan rooms and transformer vaults for the exhibition and banquet hall. Portions adjoining the auditorium are used for foyers and passageways from both

the auditorium and banquet and exhibition halls. The balance of the first and second floor is used for kitchens and service rooms, with living quarters for the caretaker on the second floor.

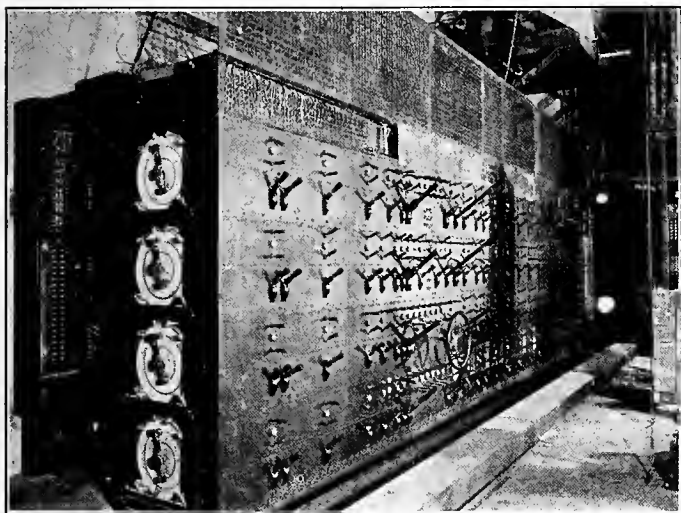
The main basement is designed for an exhibition hall. Two ramps provide direct access to outdoors. The main lighting is provided from ceiling outlets. Each column has a 1,000-watt receptacle circuit to provide for additional decorative lighting. Special power gutters for carrying three-phase and single-phase power lines to booths have been installed along both side of two ventilating ducts run exposed on the ceiling. Each gutter consists of two 4 x 4-in. sections mounted one above the other and provided with hinged covers. Heavy leads will be laid into these gutters from which taps can be taken to the booths through holes drilled in the covers.

The second floor of the banquet hall is a mezzanine entirely surrounding the first floor, and leaving an open space 64 x 213 ft.

All the lighting in the banquet hall is arranged for two-color control, the circuits being run to three panel boards distributed about the building and controlled from a switchboard in the kitchen wing. A receptacle with a 1,000-watt circuit is provided on each column under the mezzanine for decorative lighting when the room is used for exhibitions.

The mezzanine extends approximately 13 ft. inside the line of columns. At the railing, and in line with the columns, free standing indirect lighting pedestals have been installed.

A special power gutter for the first floor and mezzanine is run along the ceiling of the first floor just inside the line of columns. This gutter is 4 x 8 in. divided into two 4 x 4-in. compartments arranged side by side and equipped with hinged covers

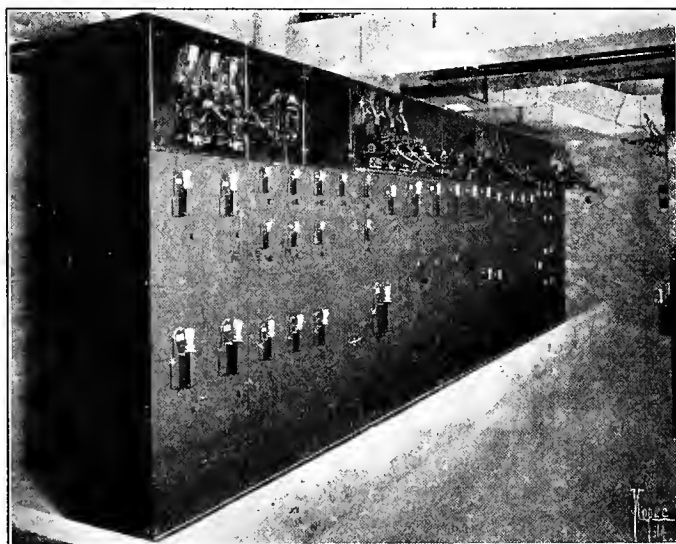


The stage switchboard at the Shrine auditorium, the largest stage switchboard so far constructed, is a Hub Electric Company pre-set, selective, remote-control board. It is 26 ft. long and has 152 main pilot switches and 279 dimmer plates.

with turn catches. Straps  $\frac{1}{8}$  x 1 in. spaced 24 in. on centers support the cables when the covers are open. Cast iron boxes 8 x 8 in. with gasketed covers through the mezzanine floor connect with the gutters below.

The special power gutters are connected to a distribution switchboard in the basement with 4-in. conduits, one conduit connecting with each gutter section. Three-phase and single-phase 600-amp. leads are brought from the main exhibition hall service switchboard to the distribution board.

A 4-in. conduit only also is provided from the outside of the building to the distribution board for



Main distribution switchboard at the Shrine auditorium, showing side view of the control panel (on extreme right) for the 150-hp., 2,200-volt motor of the 3-unit motor-generating set which provides direct current to the stage.

bringing large capacity direct-current feeders from the portable engine generator sets for dances and entertainments, requiring arc lights and color wheels.

Heavy capacity pockets are provided in seven of the ceiling trusses from which festoon lighting can be extended.

Electrical service for the two buildings is provided from four transformer vaults, two in each building. One service company supplies all the lighting in both buildings, the other company the power and the standby lighting.

The power service in the auditorium building consists of three 200-kw. transformers for light, two 100-kw. for standby light and three 50-kw. for power. In the exhibition and banquet hall building it consists of three 100-kw. for light, one 15-kw. for standby light and three 50-kw. for power. An additional transformer vault is provided in the exhibition hall building in which extra transformers can be placed to supply additional special power for various commercial uses during exhibitions.

Separate service switchboards are provided in each building so that electrically the two buildings are separate units, with the exception of certain lobby lights in the kitchen wing which are used for both the auditorium and banquet hall. All services entering these main switchboards are protected with I-T-E circuit breakers, using type L.L. and L.G. as required.

Power service for the heating and ventilating system and the organ is supplied in the usual man-

ner, the organ blower being controlled from the console.

Three 110/220-volt, 1,600-amp. lighting phases are used in the auditorium building. One goes direct to the stage switchboard contactor board, the other two are split to feed the contactor board and the several panel boards throughout the building. Two of the leads feeding the contactor board are connected on the load sides of two Sundh remotely controlled transfer switches of 600 and 400-amp. capacity, respectively, which normally are fed from the lines of the standby power company. The third lead is carried direct to the contactor board. The two circuits which are on the transferred services are used to feed the operating buses of the remote-controlled switchboard and the footlights and borders No. 1 and 2, switchboard lights and certain other circuits on which power must be maintained. The transfer switches are operated from the stage manager's station, pilot lights being provided to indicate when the normal services are "hot" and when the standby services are being used.

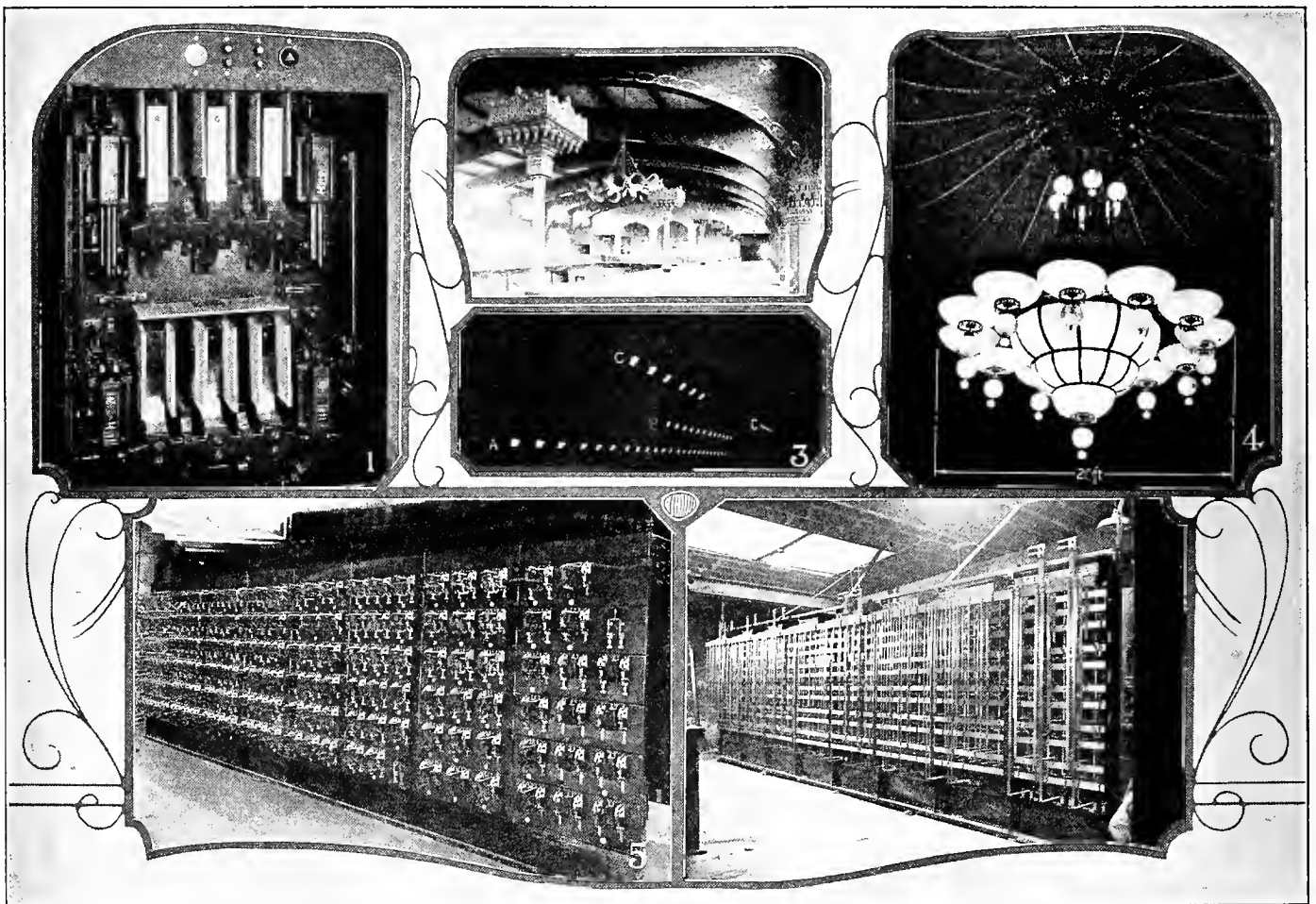
The auditorium building emergency lighting service is taken from the load side of a Sundh semi-

automatic transfer switch, which transfers automatically to the standby company on a reduction in voltage below 200 volts. Pilot lights are provided on the service switchboard and at the stage manager's station with the same features as mentioned above for the stage transfer switches. Reset switches are located directly below the pilots.

The lighting service of the banquet hall building consists of one 1,000 and two 800-amp. 110/220-volt phases. An emergency lighting transfer switch similar to the one for the auditorium building is provided for the banquet hall building with resetting stations on the service switchboard and the banquet hall master lighting switchboard.

### Public Address System

A public address system has been installed which makes it possible not only to amplify the oral action on the stage into the auditorium but into the banquet hall and exhibition hall at will. The system can be used in the banquet hall alone to amplify speeches and also can be used with outside horns at the main entrances of the auditorium and banquet hall to address overflow gatherings.



Representing some of the more interesting features of the Shrine auditorium electrical equipment: (1) A close-up of one of the Sundh semi-automatic transfer switches on the main switchboard (shown elsewhere). (2) A view from mezzanine floor of the banquet hall in the pavilion building, showing the Western Electric public address system horns installed, and the fixtures on columns from which the ceiling is floodlighted. (3) Because of the extreme stage width borders have been designed to accommodate smaller stage use. (4) The immense chandelier which hangs from the center of the auditorium, weighing 5 tons, 20 ft. in diameter, 28 ft. in length, and having an electric load of 65 kw. (5) Front view of the remotely controlled contactor panel, operated by the stage switchboard. This board is 24 ft. long and contains 142 contactors. (6) Rear view of the same contactor board, showing the busing.



At the conclusion of the meeting, it is adapted to summon cars, transmitting outlets being provided in each of the vestibules. Meetings in either of the buildings can be broadcast by remote control over telephone lines through one of the large radio stations. The system also is equipped with a radio receiving set by which messages from speakers who are unable to attend may be broadcast from other cities and heard at the conventions.

Outlets for the public address horns are located at two points in the banquet hall. This makes it possible for the speaker's table to be located either at the end of the room or at the center near one side. The outlet for basement horns is located in the center of the room.

Auditorium horns are concealed in the ornament over the proscenium arch.

Both buildings are provided with a complete conduit system for the installation of public telephone service. Provision is made for a P.B.X. board in the exhibition hall so that lines can be extended readily to any booth during exhibits.

A Western Electric selective ringing intercommunicating telephone system is installed for communication between the administrative offices of the auditorium, the several foyers, the stage manager, projection booth, green room and so forth. There are thirty-three stations on the system, and the connections have been so made that each station is able to talk with such other stations as is necessary.

George L. Patterson, of Los Angeles, was the electrical contractor for the job.

## Efficiency and Public Relations

By Mrs. Lewis A. McArthur, Portland

**A** GOOD many people today are wondering whether or not effective organization in certain businesses has not grown from an active little lizard, adapted to getting about quickly, into an unwieldy dinosaur, which carries about forty tons of body to eight ounces of brain. Some who feel that the lizard certainly has reached the proportions of Mr. Beebe's now famous marine iguana are already a little diffident about saying so lest they come in contact with its claws.

Just what is organization, this term of uncertain proportions? What is its correlate, "efficient organization?" The common-sense definition of organization may be stated as the arrangement of work in such an ordered system that it is done with the least duplication of effort and loss of time and strength.

The necessity for some sort of organization of effort is evident. The need of sparing the brain and saving the capacity of workers from routine fatigue and unnecessary loss of time is therefore an integral function of organization. To be efficient is not just to be in good form, or perhaps it would be truer to say that to be efficient is indeed to be in good form. Efficiency is the polishing of the connecting link between work and workers. It is as important to know that it is actively present in

your business as it is to know that the gears of your automobile are of a type and condition to keep your car running when you need it. It does not pay the manufacturer to expend more than a sum proportionate to his entire output on perfecting the gearing of your car. Improvement of the gears alone without accompanying progress in the manufacture of other parts of the car might result in disastrous accident. It is possible to over-refine one part at the expense of another. Just so efficient organization reaches its own point of diminishing returns.

There are other gages of success in business besides efficient organization. There is, for instance, satisfactory service to the public which, in the case of the utilities, organization was devised to serve. There is also the question of generous dealing with employees. Efficiency in the utility business may be said to reach the point of diminishing returns when human relations begin to give way to system. The efficient organization capable of replacing one man's work almost instantly with that of another, of functioning not by means of the individual but by disregard of him, tends to emphasize the machine rather than the worker. Yet the worker needs to feel, as a spur to his endeavor, that he is more than a numbered cog in the machine, that in the unconscious order of life he is worthy a place stamped with his own name. The building up of a rigid piece of business machinery may tend to produce extreme competence in a boss otherwise distinguished by lack of ability to develop his men, but it is a handicap to the initiative and self-reliance of the subordinate; and one of the greatest dangers of such a machine is that soon even the boss himself becomes a subordinate. He may be obliged by the governance of system to act contrary to his best judgment and experience. Then what hope is there for the performance of those under him?

The gravest danger to the public-utility industry in extreme efficiency of organization seems to lie in over-application to public relations of principles of uniformity and routine which prove excellent when practiced with regard to other branches of the business, as for instance, accounting. The personal touch is what counts with the public, just as it does with the employee. No remote boss, personally unknown to his workers even by sight, can have the influence of the man familiar with the hopes and problems of his workers and known to have their interests at heart. No brilliant speechmaking, no system of reports, can supply the human confidence which spurs men to creative activity or a favorable vote. Where it is helpful to suggest bits of detail or a rough outline of procedure to any one embarking on a campaign to enlist the good will of worker or public, it destroys personal initiative, responsibility, and, hence, creative interest to offer too much help or to insist upon conformity to a set of rules. It is a mistake to organize such a smoothly functioning machine that you cannot tinker with it, but must be content only to supply it with fuel, oil and water. Like a government bureaucracy, it will in the end run away, not only with those who made it, but also with those whom it was made to serve.

# Aspects of Steam Power in Relation to a Hydroelectric Supply

By A. H. Markwart\*

Vice-president in charge of engineering, Pacific Gas and Electric Company, San Francisco

**W**HENEVER a system load factor is less than unity and when the capital cost of steam plants at load centers with relatively short transmission is less than that of hydro plants with long transmission, it will be economical to carry a portion of the system peak by steam plants. In general, the cost of energy from steam plants at high load factors exceeds the cost of that from hydro plants because of the fuel charges, whereas the cost of energy from hydro plants at low factors exceeds the cost of that from steam plants on account of the higher fixed charges.

Figure 1 shows a load curve having an annual load factor of 67 per cent. It is typical of that of the Pacific Gas and Electric Company which has an annual load factor varying from 60 to 64 per cent. This curve takes the form of twelve daily load curves which are characteristic of the average day of each of the twelve months of the year. It approximately represents the load conditions which have obtained in the past and its form was determined by averaging the loads of the half-hour periods for the days including Sunday of the second week in each month of a selected year. Therefore, in effect, there would be 31 such curves for January; likewise 30 for April. From such a load curve therefore may be obtained by an area measurement, the kw-hr. for an average day for any month, because the area under the monthly curve represents the kw-hr. required for the average day of the month in question. By multiplying such kw-hr. by the days of the month, the kw-hr. demand for the month, and finally for the year, may be obtained.

From this curve was determined the load factor and kw-hr. from base and peak for percentage of system peak from 100 per cent to 32.5 per cent. This is shown by Table I. This curve indicates, for instance, that if 60 per cent of the annual peak from base is carried on hydro plants, 81.8 per cent of the required energy will be supplied on load factor 91.7 per cent. If the remaining 40 per cent

**O**F increasing interest to the industry is the growing importance of steam generation on systems normally considered to be hydroelectric. Load, transmission, and economic conditions have changed during the past decade and these, together with marked increases in steam-plant economies, have restored steam power as a serious competitor of hydro power. Mr. Markwart believes that steam power is needed on a system normally hydroelectric to effect the best system economy, for standby, for meeting seasonal hydro deficiencies, and for meeting dry-year deficiencies. Interesting facts are brought forth in the author's discussion in development and support of these conclusions.

of the peak is carried on steam plants, what is left, or 18.2 per cent of the required energy, will be supplied at a load factor of 30.6 per cent.

With this information the cost per kw-hr. from steam plants and from hydro plants may be obtained under various assumptions of oil, money, operation, maintenance and depreciation costs, and of capital cost of steam plants and hydro plants including transmission.

Without attempting to develop this it may be stated that the best theoretical economy in kw-hr. cost under present-day conditions with such a load curve is had by carrying approximately 80 per cent of the maximum demand from the base on hydro, and the remaining 20 per cent from the top on steam. But, as a practical matter, steam in excess of this may be

TABLE I—LOAD FACTORS AND PERCENTAGES OF TOTAL OUTPUT FOR VARIOUS PERCENTAGES OF THE ANNUAL PEAK BOTH FROM BASE AND PEAK

Per cent of annual peak	From base		From peak	
	Load factor	Per cent of kw-hr	Load factor	Per cent of kw-hr
100	67.3	100.00	0.0	0.0
95	70.8	99.96	0.3	0.02
90	74.6	99.89	0.8	0.11
85	78.6	99.36	2.9	0.64
80	82.3	97.91	7.0	2.09
75	85.4	95.23	17.8	4.77
70	87.6	91.18	19.5	8.82
65	89.7	86.73	25.5	13.27
60	91.7	81.81	30.6	18.19
55	93.6	76.56	35.0	23.44
50	95.5	70.95	39.0	29.02
45	97.4	65.17	42.6	34.83
40	98.8	58.75	46.2	41.25
35	99.8	51.96	49.7	48.04
32.5	100	47.95	51.7	52.05

\* Computed for the load curve of Fig 1 having an annual load factor of 67 per cent

carried without material increase in the cost of the mingled kw-hr., as curves which can be prepared will show that there is comparatively little variation in cost over quite a range either side of the minimum point. Hydro to 75 per cent of the demand, and steam to 25 per cent, may be considered within the range of practical economy. Under this condition the hydro will produce 95.2 per cent of the total annual energy at a load factor of 85.4 per cent, and the steam 4.8 per cent at a load factor of 17.8 per cent.

The foregoing remarks apply exclusively to the idea of economic production of kw-hr., all other considerations being neglected. These statements have

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as their basis primary hydro power and neglect consideration of years of deficient water supply. They also neglect consideration of the amount of

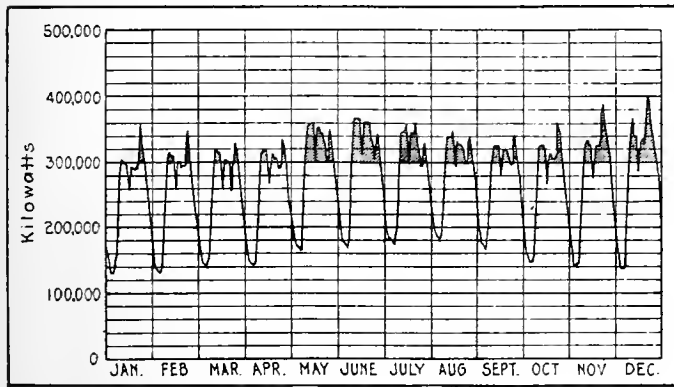


Fig. 1. Typical daily load curve.

energy which might be generated while running steam plants regularly at reduced loads in order for the steam units to be in that operating condition to render possible such service as stand-by implies.

Were it safe to assume the present-day low fuel prices for an indefinite period, steam power for the base load of a regional supply like that of northern California could compete on very favorable terms with the cost of a combined steam and hydro supply, or a hydro supply. Broadly viewed, however, it would appear to be hazardous to assume such a favorable condition, and unsound from a standpoint of fuel conservation, for obviously it is highly proper in a region where water power is available to use such water power as far as it will go, creating for it as favorable a position as possible by the judicious use of steam power.

#### Steam Stand-By

Various considerations go to fix the extent of stand-by for a regional hydro power supply. The proper amount of steam capacity to be installed in a regional power system for stand-by purposes should be determined by the amount of preferred service required at metropolitan centers served from such a power system, by the character of the load carried, by the kind of general service which is desired, and by other policy considerations. For a metropolitan load center the maximum amount of stand-by which might be provided would be 100 per cent of the expected metropolitan peak at all times. This would be an exceedingly conservative provision. It is probable that 75 per cent protection would be considered adequate in most instances, for as a rule there is more than one transmission line into such load centers. An installation to furnish this protection would have the capacity to reduce the total peak, permitting hydro to furnish the bulk of kw-hr. on the base at an improved hydro load factor. Experience in northern California shows that a regional system equipped with steam capacity based on 75 per cent of the metropolitan peak also will be a system possessing steam reserve sufficient to supply steam kw-hr. on a base

load on dry years when the hydro supply is deficient.

Energy production from stand-by plants will vary with the size of the units which are installed or which may be installed from time to time. It will also vary with the hours of operation, or the duration of the hydro system interruption, the amount of stand-by load carried, or the capacity of the hydro or transmission unit which temporarily may be out of service, and the quantity of load that the plant may be required to carry at any instant.

The larger the unit the greater the number of kw-hr. generated even when standing by to take full or partial loads, as units of 15,000 kva. may be operated to carry a minimum load of 1,000 kw. while a 35,000-kva. high-pressure unit probably cannot be operated feasibly with a reduced load of less than, say, 3,000 kw.

As a large system may have several steam plants, the kw-hr. produced from such stations will vary with the number of stand-by plants and the number of units that may be operating in the several plants.

The experience of the Pacific Gas and Electric Company with four steam plants having a total of twelve units, none larger than 15,000 kva., indicates a kw-hr. output of 3 per cent of the total system load as a minimum. This is in addition to that percentage of output which is required to effect the best hydro-steam system efficiency and does not include the steam generation necessary to make up for interruptions to the hydro service. This latter may be large or small depending upon the nature and gravity of the failure in the hydro system.

#### Steam for Short-Water Season

When the hydro supply is put on a suitable load factor by reason of combing off a portion of peak on steam, the amount of which has been determined by economic study ideal conditions for the hydro do not even then necessarily exist. Conditions would be ideal if the steam-discharge curve were identically the shape of the hydro-load curve which remains after the steam has supplied its complement of peak and energy. For the purposes herein we may neglect the daily fluctuation of load placed on hydro, because, as a rule, this is cared for by forebay capacity. However, monthly conditions are not so easily cared for, because generally storage sites of sufficient capacity do not exist to equate the natural flows on streams where the hydro plants are situated. It then becomes necessary during the short-water season, extending from three to six months, depending upon character of water shed and the year, to build up the difference between the actual and the desired monthly hydro block by pulling steam. This does not mean that steam-plant capacity would be provided in addition to that determined by other considerations, such as stand-by at load centers or steam capacity to meet years of deficient run-off.

It behooves the power companies to use every effort to effect all possible storage to meet the

seasonal short-water condition because it means a saving of fuel which is an important matter, particularly on those years when fuel cost is high.

The foregoing statements relating to seasonal stream flow refer largely to primary hydro power which is available the larger portion of the time. It should be noted, however, that under some circumstances it may be economic to make use of additional steam to permit the absorption of secondary power. Under such a plan of using stream flow, steam-plant operation would be required to an even greater extent than would be required with primary hydro power during the short-water season.

Seasonal steam-generated energy will tend to increase because of the desirability, in the public interest, of absorbing by-product power from storage works erected primarily for irrigation. Since agriculture is fundamental, land for it should be developed to the greatest extent that can be shown economic, proper balance of crop production and demand considered. Such by-product plants must be increased in power capacity to absorb the power of the annual irrigation flow, 60 per cent of which occurs during the three summer months. Power from such plants is largely secondary, as the flow of water is determined wholly on the basis of irrigating the maximum number of acres of land. Under such a condition the seasonal make-up from steam would be greater than that where water is held in such reservoirs to a desired level and discharged at a rate better to answer the power needs rather than the irrigation demand of the maximum number of acres.

### Dry-Year Steam

The power companies in California have been operating for about 30 years and reliable water run-off records for most of the streams are available for about 20 years of this time. It appears that the last eight or nine years which cover the period of greatest expansion in the industry have been deficient in precipitation, in fact a number of these latter years have been abnormally dry.

While the run-off records are not available for a long time, fairly reliable precipitation records are. Fig. 2 is a monthly and annual precipitation record for the City of Sacramento for 76 seasons, commencing with the 1849-50 season and closing with the 1924-25 season. While this chart cannot deal quantitatively with the power problem because it does not indicate run-off, it does give a qualitative

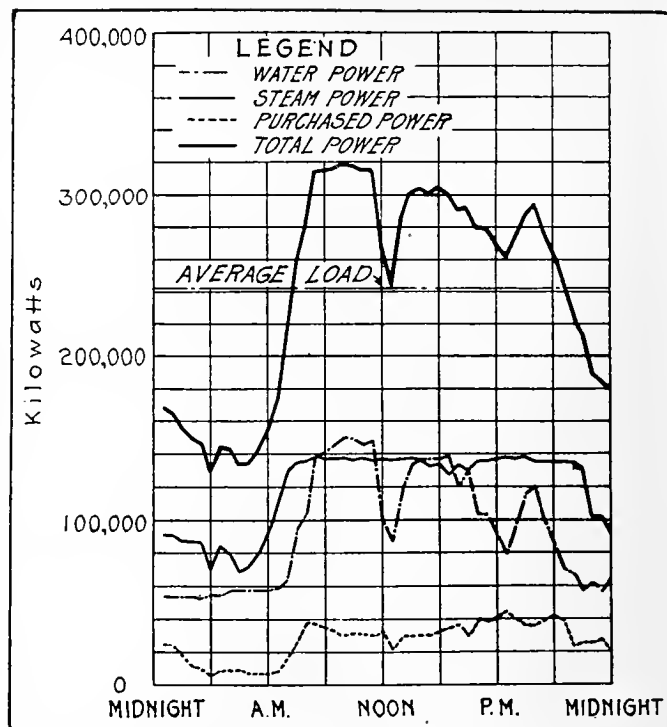


Fig. 3. Daily load curve of Pacific Gas and Electric system, Aug. 21, 1924.

picture of the situation and serves to emphasize future low water yields, as the run-off of the streams of the state of California depend exclusively upon precipitation either in the form of water or snow, except as some of its rivers might be influenced by underground contributions outside of the state such as is supposed to obtain in the case of the Pit River. Even drier years may obtain because it is believed that a period of at least 100 years is necessary in order to measure the effect of all the cyclic changes which might be expected. At any rate, a study of the chart is of peculiar interest at this time. Briefly, the chart says this: The normal rainfall for the 76 seasons is 18.5 in. During the period named the minimum precipitation was 4.7 in. occurring in the season 1850-51, and the maximum was 36.4 in. occurring in the season 1852-53. There were 46 seasons out of the 76 in which the precipitation was below normal, and 30 in which the precipitation was above normal. Of the 76 seasons there were only 24, or one-third that were substantially above normal. A further disappointing disclosure is that the normal as now determined from the available record is going down, this being particularly emphasized by reason of the abnormality of precipitation of the eight seasons preceding the 1924-25 season, two of which were less than one-half normal.

It must be inferred then that power would have had to be supplied to make up the hydro deficiency during those dry years when the water supply fell substantially below normal, if the capacity of hydro-electric development is in general based on flows of years of normal run-off, which is likely. It appears that the last eight seasons have been the longest continued dry period in the 75 of record. As a matter of fact this dry period extends back the last ten seasons if we neglect the 1915-16 precipitation

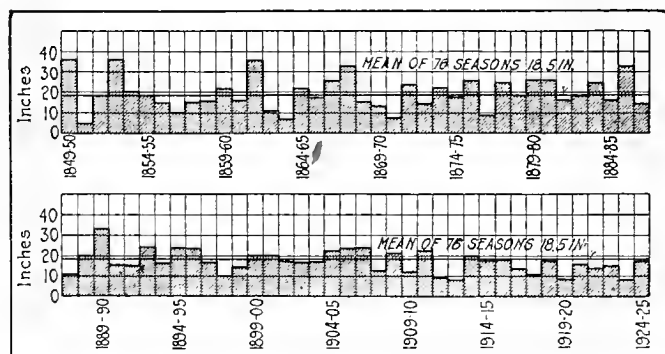


Fig. 2. Annual precipitation record at Sacramento, Calif.



of 18.3 in. The other dry periods may be noted to be either from two years long to not more than seven years. Of course it is recognized that quantity of precipitation is not the only index as to the water yield of a stream. For instance, the distribution of precipitation in the form of rain and snow in a season having, say, 18 in. might be such as to produce far more beneficial and sustained run-off than would one having 25 in., largely rain, where a bulk of this concentrated in any one month, especially were such precipitation to occur in the early fall before the cold weather comes. Actual run-off, of course, is the real criterion of the power yield of any stream, but as stated above, the chart does give a picture which will suggest a deficiency of hydro energy during the years of deficient precipitation.

Roughly, a system like the Pacific Gas and Electric Company is deficient one-third in energy output on the basis of dry years of severity that have thus far obtained. Actually, the annual run-off of streams in the northern part of the state was deficient a greater amount than this, probably from 40 to 60 per cent, taking 1923-24 as the criterion. The difference in the deficiencies comes about because of the extent to which the streams have been developed. In other words they have not been developed for the high flow which is available for but few months of the year but rather for the flow that is reasonably sustained throughout the greater part of the year as this was known from records available up to the several times of their development.

What actually takes place in dry years as contrasted with normal years is that the steam power takes its position on the base of the load immediately above the load that can be carried by stream-flow plants which are not subject to daily regulation. The portion of the load lying above the steam will be carried on those hydro plants which have forebay regulation, as far as they can, and the final balance by the steam plants, if the steam plants are not already carrying their capacity on the bottom. This normal and dry-year contrast is shown by actual daily load curves of the Pacific Gas and Electric Company in Figs. 3 and 4, the former being for August, 1924, under conditions of drought and the latter being for May, 1925, when water conditions were fairly normal. In both cases, however, the peak pulled was about the same.

Thus, if power consumption is not to be curtailed, power companies must provide the steam-plant capacity required on the dry years, because this is a condition and not a theory. In other words, were it assumed for one reason or another that steam stand-by protection at load centers was superfluous, or combing off the peak because of good economic showing on the hydro was unnecessary, steam would in any event be required to that extent necessary to meet hydro deficiency on these extremely dry years. This steam-plant capacity, as determined by experience, should be in this region of the order of 40 per cent of the anticipated system peak, and it may even be greater than this in other portions of the state.

As a coincidence resulting from the relation which exists between the metropolitan and system peaks on the system of the Pacific Gas and Electric Company, a steam-plant capacity of 40 per cent of the system peak will approximate 75 per cent of the metropolitan peak. This will of course change as the relation changes, and as more hydro plants are built on streams of sustained flow like the Pit River or on streams which may be regulated by storage works. As has been stated, the kw-hr. production of the hydro system as now developed in northern California is deficient, during dry years, to the order of one-third. This deficiency may be made up readily from steam-generating stations having a capacity of 40 per cent of the system peak or 75 per cent of the metropolitan peak. For example, with a system peak of, say 400,000 kw., of which 213,000 kw. is the load of metropolitan centers, steam capacity of 160,000 kw. at load centers would be sufficiently great to furnish the deficient hydro kw-hr. to the general system on dry years when employed on the base, and normally furnish suitable protective capacity at metropolitan centers. Likewise, this steam capacity would permit combing off the peak under normal operation to any amount that was desired to improve the hydro load factor to bring the best system economy.

As an operating problem on dry years, if during the precipitation period it appears that the stream yield for the coming run-off season is likely to be deficient, it becomes necessary to use good judgment in the holding of stored waters and the burning of oil during the spring months so that, in the late summer, the power available from steam plants and used on the base, together with power available from reserved waters when used in the top, will be sufficient to meet the anticipated load.

Under such conditions the steam plants, up to

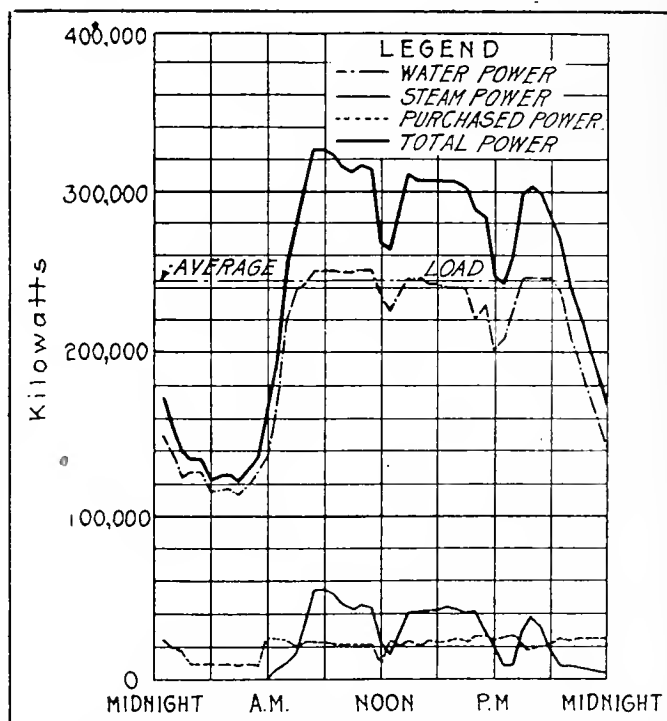


Fig. 4. Daily load curve of Pacific Gas and Electric system, May 5, 1925.

their capacity, must take of the total load, a block of a size as determined by the amount that the hydro of waters held in storage will meet. Thus during a dry year, the variations in loads are taken up by stored-water plants, whereas, in normal years, variations are taken by steam plants and stored water, except as daily variations are concerned, serving together with the stream flow to meet base-load requirements.

While the maximum overall economy of a regional system in normal-water years is had at present by generating the maximum of hydro energy at a high load factor and the minimum of steam energy at low load factor, it is desirable in the interests of economy to use stored water through hydro plants in a manner which will permit the highest possible daily load factor on steam for the obvious reason that the kw-hr. from a unit of fuel increase as the load factor improves. In modern steam-turbine plants, with boilers of 400-lb. pressure, it is possible to produce 400 kw-hr. per barrel of oil at load factors of 70 per cent and above, with less as the load factor lowers, down to perhaps 250 kw-hr. per barrel with a load factor as low as 10 per cent. While on normal years it may not be possible to operate for ideal fuel consumption, it is quite possible to do so in dry years. In such years, when annual costs become an important consideration the load factor on steam will be high with corresponding steam-plant efficiency.

Normally, steam plants must be used to supply kw. of peak, if this function can be imagined, instead of kw-hr. of energy, leaving the hydro to supply the bulk of the energy requirements. Under such condition there will be but a minimum of oil consumed, as the amount of energy required from steam when supplying the selected portion of the peak is relatively small.

On dry years, however, steam plants must be used to supply the kw-hr. of energy of the base load. At this time operating costs become a very important consideration because of the unproductive investment in hydro plants. Therefore, to improve the economic situation, the hydro plants must be operated in a manner that will produce the highest possible load factor on the steam plants, with corresponding steam-plant efficiency.

### Hydro Capacity

The desired steam-plant capacity in a combined system will be determined by the various considerations elsewhere mentioned. Hydro capacity on the other hand is involved solely with the question of economy in kw-hr. production. With the increase in distance of transmission, larger capacities of generating and transmission units, and higher capital costs of such over steam plants, it becomes necessary to install hydro plants to operate on the highest possible load factor. This is accomplished by combing a proper amount off the peak with steam plants, leaving the base load, containing by far the greatest number of kw-hr. for hydro. The hydro-plant capacity must then be that which is necessary to meet the remaining and larger proportion of the load. And streams should be developed

for the flows regulated or unregulated as may be possible on normal years, with steam to make up the hydro deficiency on subnormal years.

To illustrate again with the example of peak load of 400,000 kw. neglecting the question of spare capacity which becomes a matter of judgment, a system with an annual load factor of around 60 to 65 per cent would have a hydro capacity of 75 per cent of the peak from the base, or about 300,000 kw. This, together with the steam-plant capacity of 160,000 kw., brings the system capacity to 460,000 kw., with kva. higher, as may be required by power-factor conditions.

### Cost of Power

The cost of power from such a regional system naturally will vary from year to year. The total of fixed and other annual charges on hydro and steam-plant capacity will remain substantially the same irrespective of the output, whereas the fuel charge will vary depending upon the hydro deficiency. In dry years a portion of the hydro-plant capacity will be non-productive, and in wet years this condition will obtain with respect to steam-plant capacity. Because of this, the cost of power is therefore not constant, even though unit fuel cost and fixed charges be stationary over a long period of time. However, the average cost of energy may be ascertained with reasonable accuracy but only if a period of years which contain a dry cycle is considered. It is possible to make a summation of annual costs for such a period and apply these to the total of kw-hr. expected from hydro and steam plants for the period, thus obtaining a period average unit cost of energy. The total cost will be made up of the fixed charges on the capital invested in hydro including transmission, and in steam plants, plus operation, maintenance, depreciation, and similar costs on both, plus the fuel costs over the period considered.

### Conclusion

In the final analysis the relative development by a utility of hydro and steam generating capacity is a problem of economy; and the natural resources which are available, the character of the load to be carried, the rate at which energy must be supplied or the load factor, the extent to which other utilities may depend upon it for stand-by, and other related elements furnish the criteria for its solution. This can be illustrated by reference to the measure of steam capacity prevalent with several of the utilities of this region. The steam-plant capacity of the California Oregon Power Company, a utility with a small load, is nil, as it serves a sparsely settled territory, and its hydro plants enjoy a fairly dependable water supply. The Great Western Power Company has a steam-plant capacity of approximately 20 per cent of its system peak, relatively small but doubtless justified because of its interconnections and extensive storage capacity which is provided for regulating the stream on which its hydro plants are situated. The Pacific Gas and Electric Company, and the Southern California Edison Company, who jointly furnish about

70 per cent of the energy for the state, each have a ratio of steam to hydro capacity which corresponds fairly closely with that outlined in the foregoing. The Los Angeles Gas & Electric Company operates steam plants exclusively, as it serves a city with a high load density, and cheap fuel in the form of natural gas and oil is readily available. The general tendency seems to be for the steam-plant ratio to increase slightly. The central-station construction program for eleven western states for the three-year period 1924 to 1926, inclusive, is as follows:\*

	Hydro-kva.	Steam kva.
1924.....	243,223	139,500
1925.....	314,625	87,500
1926 (projected).....	194,550	145,000
Total.....	752,398	372,000

\*From Journal of Electricity, Feb. 1, 1926.

For these three years, the ratio of steam-plant construction to the total is 33 per cent. The installed generator capacity on Jan. 1, 1925, for eleven western states is given as 3,084,974 kw., of which 30 per cent or 935,783 kw. was steam. The steam ratio will probably remain fairly constant, but with a slightly increasing tendency until the majority of the more favorably situated hydro projects are developed. To predict further into the future is impossible on account of the uncertainty of the cost of fuel. At the present rate of growth the hydro resources will not approach complete development for another generation. The cost of fuel oil may and probably will increase, but the supply of low-grade coal which can be substituted will keep the cost of steam within reason, thus permitting fuel to continue to be a factor in the economic development of the remaining hydro resources.

# Selling More Than 2,000 Ranges in Two Months

By Robert W. Lindley

Merchandise Sales Manager, Puget Sound Power & Light Company, Seattle

THE American people's love of a record of almost any sort in work or play is not the only incentive for telling the story of the sale of 2,043 electric ranges in two months on the system of the Puget Sound Power & Light Company. This sale is believed indeed to be a record in numbers sold by one utility company in a short campaign. In addition, it represents selling a high percentage of prospects since the total figures to slightly more than three per cent of the 64,000 residential customers not having ranges at the start of the campaign. But beyond this fact and greater in importance to the industry is the revelation of what can be accomplished by co-operative planning and execution—co-operation between the manufacturer and the utility company, and co-operation between the sales department and the other departments within the utility company—in fact, by the combined efforts of the manufacturer's representatives, the sales department and all the employees. Other campaigns conducted by the company have offered just as much inducement to customers to buy, and in other campaigns the effort expended has been as great, but probably in no other campaign were the plans more carefully laid nor more meticulously executed with as fine a co-operation of effort on the part of the personnel of the company.

*NOT to cause embarrassment to a modest worker did the Journal of Electricity solicit this story of a truly remarkable achievement, but rather to bring to its readers the details of how it was done through planning, co-operation and hard work. Mr. Lindley, whose job it was to co-ordinate all the effort put into the campaign, has submitted the story to us in this spirit.*

A Hotpoint range sales campaign has been for some years an annual spring event with the Puget Sound Power & Light Company. In preparation for this one the proposal of the manufacturer was discussed at the annual district sales managers' meeting held in January in Seattle. A complete campaign plan was presented at this meeting and approved by the sales managers. The dates set were April 1 to May 31, inclusive, and, as in the case of a military offensive, a deal of preparatory work was set for completion prior to the firing of the opening gun. This work was primarily that of the manufacturer and included the conducting of a number of newspaper cooking schools throughout the territory served by the company. These schools, which were operated on the standard plan of the Edison Electric Appliance Company co-operating with a local newspaper to create general public interest, were held at Seattle, Mt. Vernon, Anacortes, Olympia, Chehalis, Wenatchee and Everett, Wash., seven key towns in different districts of the company. A second feature of the preparation was the educational work among the employees, which was accomplished by special range dinner meetings held in each district of the company to which the district managers, district sales managers and the operating

personnel were invited. At these the general plan of campaign was announced and explained to all present, and a range sales talk was delivered by R. J. Cordiner, factory representative of the manufac-

consideration was given to the number of residential customers in each not possessing ranges at the start of the campaign, and to whether or not the company served gas in any of the towns of the district. As finally allotted, these quotas, excluding possible sales to apartment houses, were as follows:

Central District, Seattle.....	537	Ranges
Southwestern District, Tacoma....	200	"
Northeastern District, Everett.....	200	"
Northern District, Bellingham.....	193	"
Eastern District, Wenatchee.....	175	"
Southern District, Chehalis.....	85	"
Western District, Bremerton.....	110	"

Total.....1,500 Ranges

### Results Attained

Although this quota was larger than any heretofore assigned in a similar campaign, it was felt that it could be reached, and when the sixty days of concentrated effort netted 1,681 ranges sold to residential customers, or 112 per cent of the quota, it



Newspaper cooking school conducted by the Edison Electric Appliance Company at the Masonic Temple, Seattle, in preparation for the range campaign of the Puget Sound Power & Light Company.

turer. Fourteen of these meetings pretty well covered the seven districts of the company and brought together a total of 600 employees.

### Terms, Premiums, Commissions, Prizes, Quotas

Detail plans of the campaign included offering the ranges at company cost plus 25 per cent when sold for cash, and cost plus 34½ per cent when sold on time. This comparatively low price, coupled with the maximum easy terms of \$10 down and the balance in eighteen months, furnished the principal incentive to customers to buy during the campaign period. In addition, a premium of an immersion water heater, or \$7.50 allowance on any other electrical appliance, was offered to each purchaser.

The regular commission salesmen of the company were paid a 10 per cent commission on the cash price of each range sold. Employees in other departments received 5 per cent commission on the cash price for making a sale, or 2½ per cent for registering the name of a prospect to whom a range was later sold during the campaign. On such sales an additional 2½ per cent commission was paid to any other employee completing the sale.

Considerable additional interest among employees was created by the offer of special prizes to be competed for by districts. The first prize, a large silver loving cup known as the H. J. Gille Trophy, named for the general sales manager of the company, was placed in competition to be awarded to the district reaching the highest percentage of its quota. Individual prizes also were offered to all employees for selling the greatest number of ranges. The first prize in this class was a complete electric kitchen equipment consisting of a Hotpoint white enamel range, a water heater, a toaster and a waffle iron.

The territory served by the company is divided into seven districts of varying size and extent. In assigning quotas of range sales to each district due



The H. J. Gille Trophy which was in competition among the districts of the Puget Sound Power & Light Company, Seattle, during the Hotpoint range campaign of April and May, 1926. The cup was won by the Northeastern District, consisting of territory around Everett.

was seen that the optimism of the sales department had been justified. In addition to the number sold to residences, it was gratifying to note that 362 ranges had been placed in apartment houses.



throughout the districts, bringing the grand total up to 2,043 ranges, of which 1,913 were Hotpoint. Practically all districts exceeded their quotas, the H. J. Gille Trophy having been won by the North-eastern District, Everett, with the sale of 341 ranges, or 170.5 per cent of its quota. The district grand prize of \$100 also was won by this district, and its sales manager, H. S. Atwood, carried off the sales manager's prize of an electric ironer presented by the Pacific States Electric Company.

Some truly remarkable individual records were made. Among these was that of the winner of the first prize, consisting of a complete electric kitchen presented by the Edison Electric Appliance Company, C. W. Sherman, light and power salesman, Bellingham, with the sale of 98 ranges. The second prize, a sewing machine presented by the Graybar Electric Company, for the greatest number of water heaters was won by Gordon Gallagher, Bellingham, while C. H. Gillespie, light and power salesman, Everett, won the third prize, a Premier Duplex vacuum cleaner presented by the Edison Electric Appliance Company, by selling 70 ranges. The work of a number of other salesmen who approached these records was also very gratifying.

Contributing to the success of this record-breaking campaign was of course the newspaper advertising carried on over the entire system of the company, and the selling demonstrations held in several offices of the company. It is estimated that some 1,200 interested women attended the latter, and those of

company's standpoint, a particularly desirable one to use.

It is also interesting to note that the gross sales value of the ranges sold was in excess of \$250,000 and that an analysis of the final results has shown a merchandising profit. It is believed that had the same volume of sales been extended over a period of time longer than two months, there might not have been a profit because it is only through concentrating for a short time that campaign expenses can be kept down. This is an element of merchandising ranges which makes this company believe in short, high-pressure campaigns as against effort longer drawn out and less intensive.

It should be remembered in connection with this campaign that the company has been pounding into the consciousness of its customers for years the facts that for many reasons electricity is the best fuel for cooking, that the electric range is no longer in the experimental stage, that there are several thousand in successful operation on the company's lines, and that electric cooking is not expensive. The result of this long-continued effort has been accumulative, and each year the resistance is less. But to sell a quarter of a million dollars worth of merchandise in two months requires something more than accumulative effect of past effort, and in a word the success of this campaign may be attributed to following out Mr. Gille's carefully laid plans and to the co-operation secured from the entire company personnel. In maintaining a high pitch of enthusiasm among the employees the influence of the district sales managers was felt particularly, and the work of R. J. Cordiner, factory representative of the manufacturer, was at all times helpful.

### Service Manual Issued by Pacific Gas and Electric Company

DESIGNED to answer many of the questions which might be advanced by present or prospective consumers, a twenty-four page service manual has been issued by the Pacific Gas and Electric Company as a guide to its service. The purpose of the booklet is to present suggestions calculated to show consumers how to take the best advantage of the gas and electric services offered by the company and how to get from them the maximum in comfort, convenience and usefulness.

The booklet contains sections devoted to applications for service, methods of establishing service, deposits, and many pages devoted to the subjects both of gas and electricity. Among the topics discussed in the section on electricity are voltage, fuses and fusing, lamps, various appliances, and instructions regarding meter reading. Indicative of the new trends in the industry is a section devoted to the subject of radio noises.

The manual was prepared by the publicity and advertising department of the company under the direction of J. Charles Jordan, advertising manager.



Three of the advertisements used in the successful range campaign of the Puget Sound Power & Light Company during April and May, 1926.

them that did not become purchasers during this campaign doubtless will be excellent prospects in subsequent ones. The comparatively low price and attractive long-term payments, along with the added inducement of a premium, was of course a factor in inducing purchases during the campaign period. It is interesting to note that over half of the purchasers took the water-heater premium, thus contributing materially to the \$111,000 annual revenue added. The excellent revenue-producing qualities of this premium and its general acceptability to range-users would seem to indicate that it was, from the

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

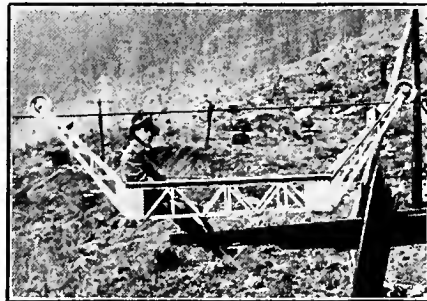
## Cable Car Design Incorporates New Safety Features

A new-type, safety cable car has been devised by the chief structural draftsman, C. C. Galsbraith, of the Portland Electric Power Company. This car is for use in connection with the construction and maintenance of that company's 57-kv. transmission line from its Oak Grove plant.

The right-of-way for this transmission line follows the canyon of the Clackamas River for several miles. Rather than follow all of the minor curves and bends of the river the line crosses the river some twenty-eight times. In fact it was necessary to cross the river this number of times in order to minimize the number of angles in the line and to find suitable foundation space for the towers. The main mode of access to this project is via the company's railroad line which follows the river closely and is located entirely on the north bank of the river. Thus it will be apparent that 14 sections of transmission line are across the river from the railroad.

To make accessible these otherwise isolated sections of line 14 cable ways were constructed across the river. These were designed to transport both

men and material and to serve for maintenance work during the life of the line as well as for use during the construction period. The ordinary type of car used by stream gagers and others who from time to time have improvised various cars for this class of trans-river service has a serious dis-

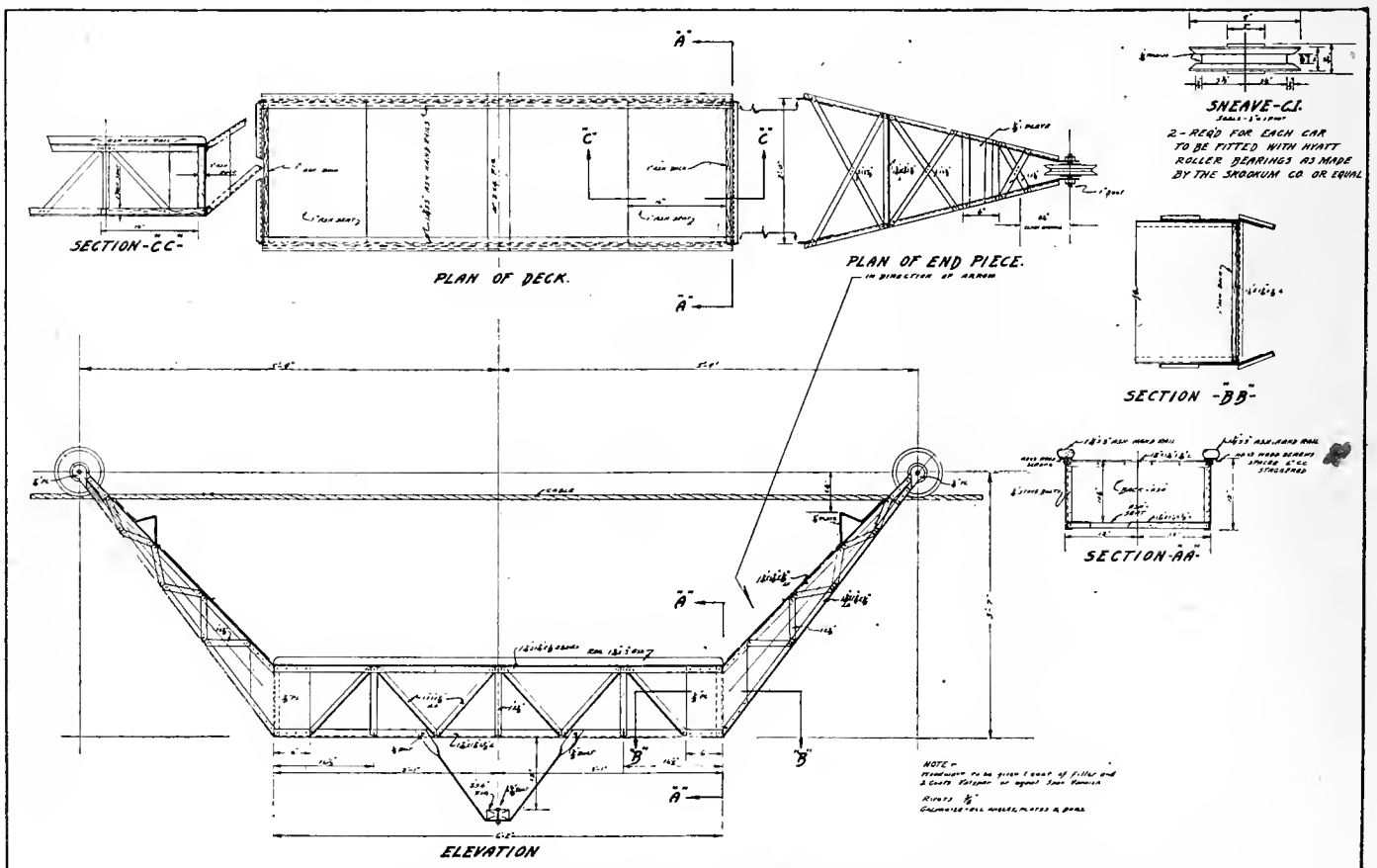


S. F. New, general line foreman, Portland Electric Power Company, riding in one of the safety cable cars.

advantage in the liability of injuring the workman's hand between the cable and the sheave. With this fact in mind a special design was worked out which obviated this danger.

As shown in the accompanying illustrations, the ends of the car are carried well out beyond the body instead of being brought up vertically as is the more usual practice. This construction puts the sheave well out of reach of the car operator. As an additional precaution against possible accident there is a light, bent metal plate fastened to the car end-frame just under the sheave. This is designed to break the grasp of the hand from the cable before any damage from the sheave could result.

Seats and hand rails are of hard wood treated with a coat of filler and two coats of high-grade spar varnish. Hyatt-type roller bearings give an ease of operation that is desirable and costs little. All metal parts are heavily galvanized to resist the weather action. Propulsion is by means of a clamp-type "puller" which will slide freely on the cable when it is in a vertical position but which grips the cable positively when the handle is deflected either way from the vertical position. This of course makes it normally unnecessary for a man to have his hands on the cable and serves as an additional precaution against injury.



Design details of safety cable car used by Portland Electric Power Company.

The cars are designed for a 1,000-lb. load, weigh about 165 lb. complete, are supported on  $\frac{3}{4}$ -in. cables fastened to suitable stumps or trees and wherever the distance above the ground is appreciable at all a landing stage is provided. The total cost of the cars complete with hard-wood seats and hand rails, galvanized finish and roller bearings was about \$75 each.

## Frequency Relay Built from a Voltage Relay

By L. F. HUNT, Development Engineer, Southern California Edison Company, Los Angeles.

About two years ago the Southern California Edison Company called into use some 60-cycle generators for service on the 50-cycle system. These units were very sensitive while operating at 50 cycles and the governing apparatus could not be adjusted satisfactorily. In order to use them without hazard to apparatus a frequency relay was required to trip the machines at but a slight overspeed. It was not practical to get a frequency relay from the

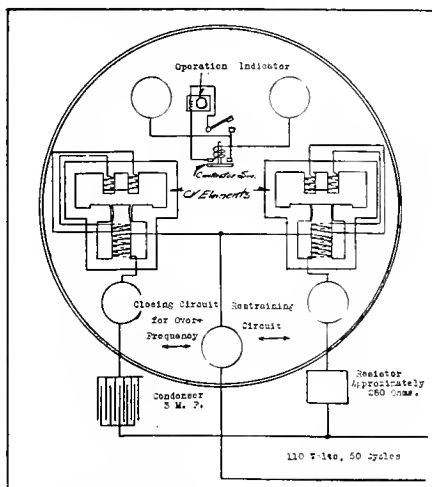


Fig. 2. Schematic wiring diagram and arrangement of emergency frequency relay.

voltage error from 80 to 120 volts was practically zero. The electrical connections are shown in Fig. 2.

The relay, when its contacts closed, tripped the generators from the system. An over-voltage CV relay also was used in parallel with the frequency relay, since in cases of overspeed the voltage and frequency tended to rise together.

During the several months of operation, the frequency relay operated several times and give satisfactory service.

## Polyphase Meter Check Method for Difficult Jobs

By WILLARD JOHNSON, Roseburg, Ore.

Many difficulties present themselves to the meter test crew. Not the least of them are those incident to the older and perhaps more isolated installations.

Large blocks of industrial power invariably are metered through instrument transformers and a polyphase meter. Errors in metering at such locations are costly to the power company serving the installation. The liability of errors within the meters themselves is comparatively small, but an error in connections is quite possible and may cause as much as 30 per cent difference in meter indication. In many of the older installations the metering leads are taken through conduits for some distance, with no provision made for access for test and with no identifying marks on any of the leads.

Several jobs have been discovered where it is impossible to get at the leads from the transformers to the meter to trace them out or even to ring them out. However, in some cases access may be had to the secondary leads from the instrument transformers and in those cases there is a method of checking that works nicely.

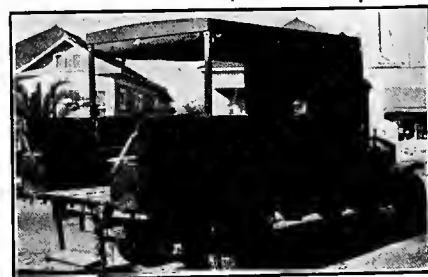
Cut the current coil of a single-phase standard in series with the secondary of one of the current transformers at the transformer. Connect the potential coils of the standard to the potential transformer corresponding to the current transformer just mentioned. This connection puts the single-phase standard in series with one of the elements of the meter it is desired to test. By disconnecting the other element of the meter under test and making the test run, a direct comparison

may be made between the standard and the one phase of the meter under test. If that particular element of the meter under test is connected correctly the indication of the meter under test and the indication of the standard will correspond. Of course, the same test method then may be applied to the opposite phase.

This method has served well in several difficult cases.

## Special Motor Truck Facilitates Line Maintenance

A Mack truck specially fitted up for the job is used to advantage in the maintenance of the Los Angeles Gas and Electric Corporation's two 110-kv. transmission lines between Los Angeles and the Seal Beach steam plant. The truck is used by the crew which constantly patrols the lines between these points keeping the insulators cleaned. The interior of the truck is fitted with two seats placed lengthwise of the body. These seats are upholstered for the comfort of the crew,



Specially fitted truck used by line maintenance crew.

and storage space is provided in the boxes beneath the seats for carrying the crew's regular equipment. As shown in the accompanying illustration, storm curtains are provided for protection in stormy weather. Full balloon tires are used on all four wheels, double on the rear wheels.

## "The Useful White Ant"

"The name of the white ant, or termite, so long has been a synonym for destructiveness that it is surprising to learn that it has its good points," states The Literary Digest. We quite agree with the statement.

It seems that the *Termes Bellicosus* performs an economic service for the natives of a former German colony in East Africa. The ground there is reported to be a coarse soil derived mostly from the weathering of granite rocks and the natives do not have the art of fertilizing or improving the soil. The termites crumble the soil in a manner similar to our earthworms. Further, they carry from deep beneath the surface a good grade of loam and with it build their mounds on top of the ground. These mounds vary from 6 to 10 ft. in height and up to 25 ft. in diameter and form veritable oases upon which the natives raise their choicest crops. These mounds also are hollowed out and serve the native coppersmiths as crude furnaces; their contents serve as prized building material. Not only do the natives profit by the industry of the ants but consider their bodies and those of the larvae as a great delicacy.

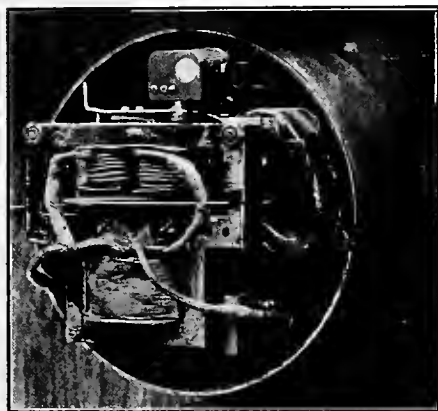


Fig. 1. Emergency frequency relay.

manufacturers on account of long delivery dates. In order to hasten this protection a frequency relay was made in the experimental machine shop of the Edison company.

The relay was made from parts of a Westinghouse CV relay. The slotted disk was replaced by a solid OA meter disk. The moving contact was connected by means of a very weak spring fastened so the contact floated just at the opened position. A second CV electromagnet was mounted an equal distance in front of the disk axis as the original element was back of the disk. A small I-14 damping magnet was placed between the outer electromagnet and the movement frame. This arrangement may be seen in Fig. 1.

The electromagnet tending to close the contacts was connected in series with 3 micro-farads of telephone condensers across the line, while the electromagnet tending to hold the contacts open was connected in series with a resistor across the line. In this particular application it was desired to have the relay adjusted to trip on frequencies above 51.5 cycles. The adjustment was made by adjusting the external resistor to the proper value of resistance. Since the CV electromagnets are identical and "Ideal" nil-temperature-co-efficient wire was used on the resistor, the temperature error of the relay was negligible and the

# IDEAS FOR THE CONTRACTOR

## Thoughtful Merchant Buys Light, Not Fixtures

Installation of the Nathan-Dohrmann Company, San Francisco,  
Result of Careful Planning to Obtain Best Utilization

By ROBERT G. DUMMEL, The Holophane Company

The store of the Nathan-Dohrmann Company, San Francisco, is an exceptionally fine example of the attractive results that can be achieved by careful planning and the application of specific equipment to obtain the best utilization of light under a particular condition.

The progressive merchant realizes that the problem today is not the production of light but the control of it, and that no one type of luminaire will give maximum results under all conditions. From the merchant's standpoint the acid test of good lighting is its selling power. Sales power results from a careful study of the kind of merchandise and the design of a lighting system that will show that merchandise at its natural best. Every merchant realizes that with no light he would sell no goods, yet, conversely, few seem to realize what a tremendous bearing good lighting has on sales. Careful study, attention to detail, and elimination of guesswork is typical of the successful merchant and this is true of the Nathan-Dohrmann Company.

The retail trade of this firm is devoted to art objects, china, silverware and household appliances. In addition to the general lighting, several unusual treatments were incorporated to show each particular class of material to its best advantage. The general illumination on the first and second floors is obtained with Holophane reflector-refractors on 11-ft. centers and

giving a uniform value of 12 foot-candles. It was found by test that the prismatic type, in addition to its efficiency, appearance and low depreciation, showed no color distortion in bringing out the many brilliant colors on the china and glassware.

All fixture parts are finished in the same color as the ceiling, which is light caen stone. In each of the four central bays on the first floor is suspended a large ornamental, glass-paneled, lantern-type luminaire, as shown in Fig. 1. Within these luminaires are concealed 300-watt prismatic reflectors which direct a maximum amount of the light to the work, a combination of utilization and ornamental effect not often achieved.

A unique and attractive scheme is used to illuminate displays on glass shelves, backed by mirrors, along the east and west walls and around the columns. A wood overhang projecting 15 in. from the wall and 7 ft. high contains a concealed system of prismatic reflectors with 25-watt lamps on 15-in. centers. Below each reflector and flush with the underside of this cornice is a special prismatic condensing plate which intensifies the light in a very narrow downward angle, thereby confining the illumination to the display on the glass shelves and preventing wasteful spillover. One of these displays may be seen in Fig. 2. The effect is beautiful; color in a vase or bowl is brought out by light from the inside which appears to

make it glow. There are fourteen columns and over 450 linear feet of wall space treated in this manner on two floors. Corners and areas, therefore, which are ordinarily unnoticed, are made to stand out and command attention solely through the remarkably attractive force of correctly applied light.

An interesting feature of the second floor is the fact that all daylight is excluded. The result is that the intensity and direction of the light on the display are at their best and constant at all times. Daylight always has been looked upon as the desirable thing and yet because of its continual variation in intensity and color it can be surpassed by the accurately planned electric lighting system.

The third floor, devoted to household ware and the retail offices, is illuminated by direct type prismatic enclosing units over the merchandise and by semi-indirect enclosing units (Filterlites) over the offices.

The entire fourth floor is occupied by the general offices and is illuminated by Filterlites throughout.

The fifth floor is taken up with an "as is" sales area, lunch room, mechanics' shop and similar departments. The lighting in each of these departments is designed to give maximum results by specific treatment.

The basement and sub-basement are devoted to stock, shipping and receiving. An interesting feature of the aisle lighting between stock bins and also the various corridors throughout the building is that a new type of asymmetrical-distributing corridor-type unit is used. The prismatic construction of this piece is such that most of the light is directed over the long di-

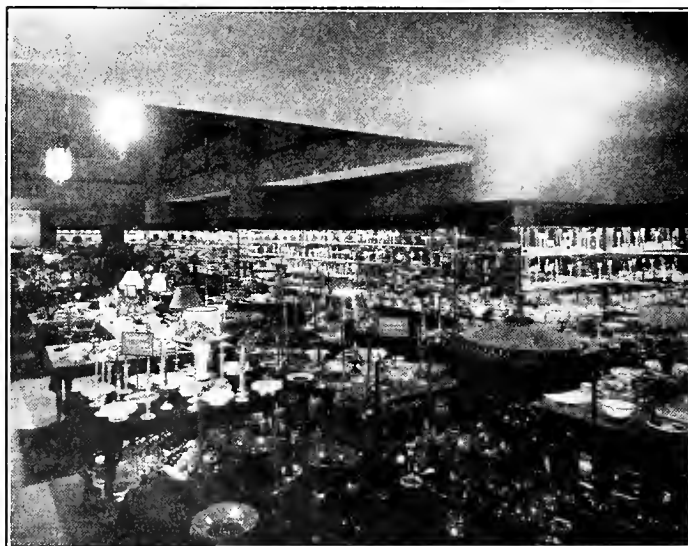


Fig. 1. Lantern-type luminaires in the central bays on the first floor of the Nathan-Dohrmann Company store. Each of four of these luminaires is equipped with 300-watt prismatic reflectors.



Fig. 2. All daylight is excluded from the second floor. Concealed units are installed in the overhang along the west wall. The overhead units providing general lighting also may be seen.



mension, giving uniform illumination at a spacing of three times the mounting height. This is to be contrasted with the case of bare lamps where uniform illumination is obtained at a spacing equivalent to the mounting height.

The show windows are lighted with an enclosing type 200-watt prismatic reflector. The condensing plate over the mouth of this reflector controls the light and prevents glare.



One of the eight show windows of the Nathan-Dohrmann Company store at Geary and Stockton Streets, San Francisco

The service of the engineer did not end with the completion of the installation. A schedule of lamp renewals is laid out to insure proper relamping. A cleaning schedule also is determined so that, having efficient equipment to start with, the standard of service may be maintained constantly.

Progress in scientific illumination is making tremendous strides and the thoughtful merchant or manufacturer will buy, not fixtures, but light.

the gears designed for this form of drive a complete unit of utmost efficiency, compactness and economy results.

An inspection of almost any plant, devoted to the manufacture of almost any product, will reveal one or more places in which silent chain drive would result in increased efficiency. Adoption of this drive also will eliminate many objectionable features of other forms of driving mechanism. To create a logical form of reasoning along this line, in the mind of the estimator, several examples of practicable application are given in this article.

#### Paint Mills

In the paint industry silent chain drive is used for driving line shafts, grinders, mixers, tinting mills, iron mills, roller mills, tandem and experimental mills. The service in paint mills is extremely severe and requires the positive contact, coupled with flexibility, offered only by silent chain drive.

#### Compressors

Silent chain drive has proved particularly successful in the driving of compressors. This is usually a heavy-duty, intermittent load service, offering a severe test to any form of drive. The usual practice is to use short center drives on compressors, and the chain drive meets this specification in a very practicable manner.

When ventilating fans are installed in connection with metal duct systems the transmission of noise through these ducts sometimes reaches a very objectionable degree. This is particularly true in theatres, schools, churches, office buildings, etc. To reduce this noise as far as possible the usual practice is to use large fans, run at very slow speeds. Silent chain drive permits the use of standard speed motors with minimum noise of operation.

#### Machine Tool Drives

The force transmitted by the chain is positive but elastic and is equal to the "instant demand" made upon it at any time during the machine's operation. The chain will deliver the required power continuously at the set speed and rate of feed desired, resulting in increased production, higher quality of products and saving of power. Carefully made tests between belt drive and silent chain have shown an average of 20 per cent greater output and 20 per cent saving of power in favor of chain drive.

To take each industry and cite the many advantages to be gained by the use of silent chain drive would require a great deal more space than can be given here. For the benefit of those who desire a general knowledge of the possibilities of this form of drive it may be well to mention a few of the many industries in which hundreds of these drives now are being used to advantage:

**Rubber Mills**—Line shafts, countershafts, strainers, devulcanizers, washers, mixers, cookers, calenders, presses, and tire trimmers.

**Paper Mills**—Beaters, washers, cookers, calenders, cutters, embossing machines, fans and jordans.

**Cement Mills**—Ball mills, tube mills, kominuters, conveyors, elevators, hoists, kilns, dryers and bag filling machines.

## Electrical Estimating for the Contractor—XIII

### Applications of Silent Chain Drive for Motor Connection Many and Show Certain Advantages in Efficiency

By J. R. WILSON\*, Quality Electric Company, Los Angeles

An estimator's knowledge of power-transmitting mediums would not be complete without a consideration of silent chain drive. There are a great many places where this form of drive is the only practicable method of connection between the prime mover and the driven machinery. A consideration of the claims made for this form of drive will suggest to the estimator many power transmission problems which may be solved therewith.

Some of the claims made for this form of drive are as follows:

1. It shows highest sustained efficiency of all mediums (98.2 per cent.)
2. It can be run at relatively high speeds, in either direction, and transmit any amount of power.
3. It can be used on short or long centers, giving a positive velocity ratio, and is not affected by heat, cold or moisture.
4. It reduces journal friction to a minimum, on account of being run

slack, and the action remains perfect even after long use.

5. It cannot slip, and permits a high ratio of speed reduction in a single drive.

6. It operates quietly, and having more teeth in working contact (than spur gearing) results in smoother action and less wear.

7. While being positive in action, it also introduces the desirable element of elasticity thereby reducing the shock load danger.

8. In replacing direct connected setups standard speed motors may be used and mechanisms operated at most desirable rate.

9. As these drives can be operated at any angle, valuable floor space sometimes is saved by their adoption.

The general construction of the different makes of this form of chain is essentially the same. "Basically it consists of a series of leaves or plates, the joints being segmental, case-hardened liners or bushings and case-hardened steel pins." When used with

\* All rights reserved by the author.

**Tanneries**—Staking machines, wash wheels, rollers, glazing machines, extract drums, wringers, cheeking machines, hide reels, compressors, buffing machines, hair washers, rockers, unhairing machines, bark mills, brushes, fleshing machines, bleach hoists, fans, trimming machines, liquor pumps, conveyors, working out machines, deep well pumps and elevators.

**Textile Machinery**—Spinning frames, twistors, knitting machines, worsted draw frames, ribbers, sewing machines, cone winders, loopers, silk finishing machines, cotton weave looms, extractors, picking machines, tape or binding looms, blowers and hosiery presses.

**Candy Factories**—Mixers, pullers, beaters, mills, enrobers, conges, continuous cookers, longitudinals, melangers, starch machines, dryers, cutters, plastic machines, rolls, pulverizers and roasters.

An inspection of the above list will reveal many types of machines used in industries other than those mentioned. Potteries, steel mills, woodworking plants, printing machinery, grain and flour mills, and other industrial plants all offer opportunities to the estimator who is interested in giving his clients the highest type of installation. The first cost of silent chain drive against belt or gear drive may or may not prove to be higher. But the longer life and lessened upkeep cost should be the determining factor in an estimator's recommendation.

Each job should be engineered carefully, and all factors carefully weighed. First cost is not always the prime consideration in making an industrial installation. Permanent satisfaction to both the customer and the estimator can be realized only by taking into account the factors of upkeep and flexibility of future expansion. "First cost" should be really the last consideration.

The question of what type and make of silent chain drive to recommend is regulated by the particular machine and duty it is expected to do. There are several manufacturers of this type of drive, and it is not within the scope of this article to consider the merits

of each make. Each maker issues literature covering the design and claims made for his product.

It would not be practicable in such a limited space to give the tables and data pertaining to the use of silent chain drive, as the subject is very large. By applying to the local agent

blind hub and is tapped for standard pipe or conduit. This part also is designed to serve as half of a bolted clamp, the other half of which is made of sheet steel stamped to fit the outside of standard pipe or conduit. The two parts are assembled with brass machine screws and nuts.



Main switchboard installed in Beck's garage in San Diego, Calif. Note the method of making an effective ground using a clamp bolted to the conduit. Connection to the water pipe is made using a smaller size conduit.

the estimator will receive the unlimited co-operation of the agent and such data as he may need.

The writer wishes to recommend the following Link-Belt Company booklets for perusal and study by those estimators who are interested in acquiring authentic information pertaining to this form of drive.

	No.
Data Book	125—General Information.
" "	299—Drives for Rubber Mills.
" "	424— " " Paper Mills.
" "	345— " " Cement Mills.
" "	309— " " Grain Elevators.
" "	310— " " Clay Working Machinery.
" "	312— " " Machine Tools.
" "	383— " " Tanneries.
" "	426— " " Shoe Machinery.
" "	425— " " Textile Machinery.
" "	543— " " Textile Machinery.
" "	430— " " Sewing Machines.

This and other companies' engineers will be pleased to furnish information to meet any particular conditions requiring them. The writer would be pleased to list the booklets of other manufacturers if such information were at hand.

### Time Saved in Assembly by Use of New Ground Clamp

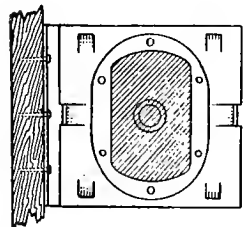
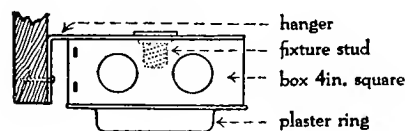
Considerable time may be saved by contractors by using a new ground clamp patented by R. A. Schmitt of San Diego, Calif. The clamps are threaded fittings designed to make an effective bond between conduit and piping systems.

The cast-iron part is made with a

The iron and steel parts are electro-galvanized as a protection against corrosion.

The clamp allows for contraction and expansion and eliminates the use of a copper wire to a water pipe in making service grounds. It provides a rigid ground throughout and does away with the danger of mechanical injury. In addition to being bolted to the conduit, two sets of screws seated in the conduit provide added ground connection.

Frequently corrosion will set in between copper and iron in an ordinary installation. This condition is done away with. In addition to the time saved in general assembly, the time consumed in sweating the copper wire to the ordinary ground clamp is saved.



Universal outlet box which may be used for a ceiling, bracket, switch, or convenience outlet. It is installed by putting three nails or screws into the stud and then putting the box itself into place. The box is manufactured by the Peccop Manufacturing Company of Los Angeles.



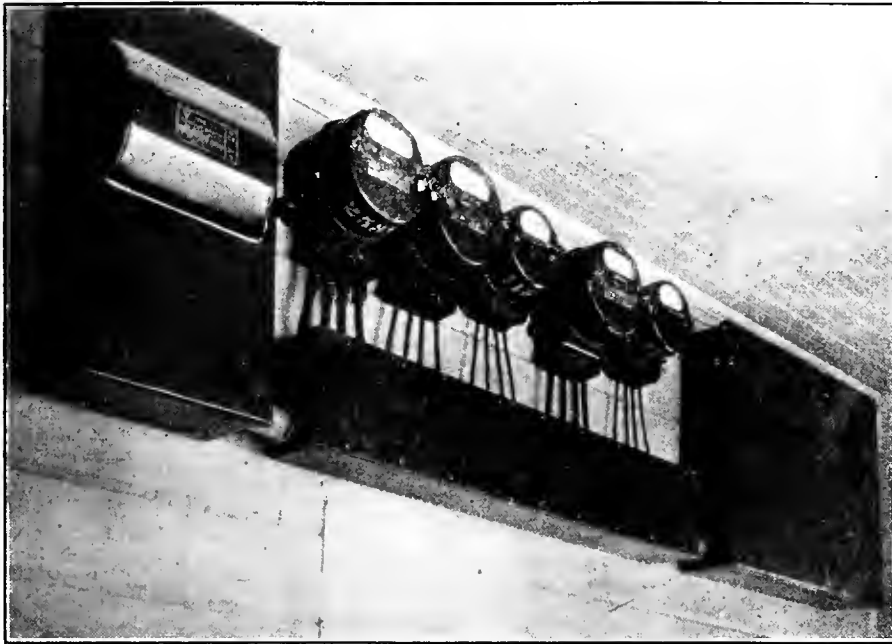
Attractive store of the Radio Electric Shop, Sonoma, Calif. A. J. Martinson, the proprietor, is an electrifier.

### Contractor Installs Individual Meters in Own Home

Segregated figures covering the cost of operation of an electric range, water heater, air heaters and lights in the home are usually impossible to obtain

heater, air heaters and lighting. In this way the amount of current consumed by each of these appliances is obtained. The meter readings of each are placed on a chart just below the meters.

Mr. Cornick has obtained some valu-



Master meter and individual meters for range, water heater, air heaters and lighting installed in the home of Tully N. Cornick, an electrical contractor in Petaluma, Calif. In this way the amount of current consumed by each of these devices is obtained.

accurately, as only one meter is installed.

This problem has been solved satisfactorily in his own home by Tully N. Cornick of the Cornick Electric Company, Petaluma, Calif., by installing a master meter, which records the total amount of current consumed, and individual meters for the range, the water

able figures for use in selling ranges and water heaters. When prospects ask about the cost of operation of these devices he can give them actual cost figures in his home. This gives the customer a definite basis on which an intelligent estimate may be made as to what it may cost in his particular case.

### Industry Joint Conference to Study Trend of Wiring

Representatives of the four principal branches of the electrical industry are being organized as a fact-finding body to make a thorough study of the trend of wiring. This body will investigate the cost of wiring and the influence of various wiring methods on the progress and adequacy of wiring installations, with particular reference to house-wiring.

Advocates of all metal construction, knob and tube work, and non-metallic sheathed cable long have been in controversy over the effects of the different systems on the sale of house-wiring and therefore on the expansion of the market for electrical equipment and appliances.

The Association of Electragists and the wiring committee of the National Electric Light Association jointly have invited Earl E. Whitehorne, commercial editor of *Electrical World*, to call together representatives from the four associations of the electric power companies, contractor-dealers, manufacturers and jobbers to develop the needed facts on which the industry may base intelligent opinion. The Electrical Manufacturers Council and the Electrical Supply Jobbers Association have agreed to support such a market study.

The general lines along which this joint conference may be expected to direct its survey may be indicated by the following ten questions which are to be considered:

1. What is the present trend in the cost of wiring?
2. Is the present cost of wiring retarding the installation of electric lighting and appliances or restricting the adequacy of installations?
3. What is the present trend in the adequacy of wiring?
4. What influences today are encouraging or restricting the adequacy of wiring installations?
5. What is the influence on the progress of house-wiring of different systems of electrical construction required by municipal regulations within a community, such as a "rigid conduit only" and the "all metal standard?" Is a larger percentage of houses being wired, or are wiring installations more adequate where "knob and tube work" is common or where non-metallic sheath cable has been used extensively?
6. Is excessive cost of wiring, if and where found today, chargeable to over-expensive material or to an abnormal scale of wages for labor, or to restrictions on the output of labor?
7. Are present wiring methods wasteful and does the cause appear to be super-standards of quality in wiring materials and equipment, or lack of training and skill in workmanship?
8. If buildings, old and new, are not being wired in sufficient number or adequately wired, how often is the restraining influence the higher cost of electric current?
9. Is the progress of house-wiring being held back to any extent by over-restrictive policies on the part of the central station in regard to extensions or capacity or readiness to serve?
10. Is slow progress in the wiring of houses and the inadequacy of installations commonly chargeable to lack of co-operation between the contractors and the central stations, and who is most responsible?



A. W. Grimmstein of Redwood City, Calif., prepared this attractive radio and appliance window display. Note the use of the Electragist symbol on the window.

# BETTER MERCHANDISING

## The Washing Machine---A Self-Starter

Experience Proves That the Washer Starts the Household in the Use  
of Other Electrical Appliances



### Washing Machines—Who Will Buy? Is the Question Asked

Who will buy washing machines? Is the saturation point at hand, or is there a saturation point, any more than there seems to be a saturation point in automobile sales?

A few years ago the wise heads of the automobile industry had a headache, individually and collectively. What to do with the so-called saturation point, that was the question. Time rolled on, regardless of the worry of those who do such things as worry, and the theoretical saturation point was reached and nothing happened. All the breath-holding had been sheer loss of air.

There just wasn't any saturation point to the public's desire for better and more cars. True enough, there were used cars by the lot-full wherever there were vacant lots. But, aside from tobogganning the prices of some of these temporarily, nothing happened to the market.

As long as better cars were being made there were people hungry for them and ready to give away the old buggy to get one. So it came to pass that those who hitherto had walked bought the discarded cars at a price they could afford to pay and became, in turn, good prospects for next year's new straight nine with interlocking cylinders and improved swaffle valves on the main vimbraces.

So with the washing machine! There will be no saturation point in washing-machine sales so long as up-to-date manufacturers improve models, as long as there is washing to be done in the home, as long as terms are easy and service good, or as long as machines are available to every housewife. The new machine will be for the more prosperous and the rebuilt or second-hand machine for the less prosperous but no less anxious housewife who probably needs it most.

There is a market for rebuilt washers, even as there is a market for rebuilt cars, typewriters, adding ma-

### Why Sell Washers?

Washing machines are among the favored three appliances—the iron, the vacuum cleaner and the washer.

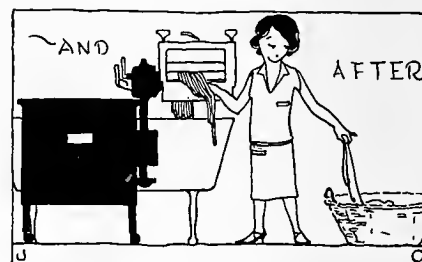
As a load-builder the washing machine is a good beginner. By itself it uses little electricity, it is true, but its running mate is the iron, and it creates a demand for the ironer, which IS a good load builder.

The washing machine is the entering wedge to make the home electrical. If it is a good washing machine it requires very little servicing or care. It brings the message of electrical convenience. It creates a desire for more of the same sort of medicine—more electrical convenience. It is a good-will builder and an appliance sales builder.

Who should sell the washing machine? The drug store? Hardly. The electrical merchandiser, certainly. The central station should sell it. The electrical dealer should sell it. The specialty shop WILL sell it, and if the electrical men do not handle the washing machine the non-electrical merchandiser, the department store, hardware store, household furnisher, and even the drug store will sell it—and make money selling it, for they would not sell them if there wasn't money in them.

One central station, as related in these pages, has sold over a thousand each year for several years, and most of those each March. It pays that company. Other pungent thoughts pertaining to washing-machine selling is contained in this Better Merchandising Section. There may be some idea here which has never occurred to you, some that you have forgotten.

**READ ON AND PERHAPS  
PROFIT.**



In the following brief stories he who cares may read of prospects where no one thought prospects grew, of applications of washing machines to which the indifferent merchandiser has not given thought. They present some sales ideas usable by anyone selling washing machines. They uncover possibilities perhaps well enough known to the experienced specialty salesman who overlooks no opportunity to make a sale but which the electrical fraternity has not yet utilized.

They are light reading, and all are "true confessions." Moreover, the artist has spotted the highlights in a number of accompanying little sketches so that they cannot be missed. Read on—

### Left a Widow, a Washing Machine Provides Her Livelihood

In the state of Pennsylvania there lived a man, his wife and their three children. Then came the influenza epidemic; the husband and father contracted the disease and in three days he was dead. When the estate was settled the widow was left with a one hundred dollar equity in the little home for which they had been struggling to pay. She was a woman with no special training in earning a living. She desired very much to keep her little family together and to look after her children herself, but there seemed to be no way of doing this except by taking in washing.

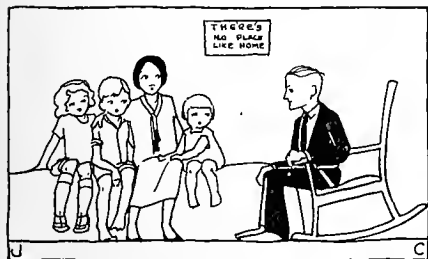
Her plight came to the attention of an electric washing-machine salesman. He called upon her and suggested that she buy an electric washing machine. At first the idea of going into debt for more than a hundred dollars when she so much needed every penny she could get did not appeal to her.

However, the salesman presented the proposition as an investment that would set her up in a little business. She could conduct it in her own home and the washing machine would enable her to earn much more than she could if she attempted to do all the washing

chines, and California bungalows. Good salesmanship sells them all, and still more cars, typewriters, adding machines and California bungalows are turned out each year.



she took in by hand. In the end, after terms of payment had been arranged making it possible for her to meet them, she did make the purchase. The machine relieved her of the hardest work of washing; it made it possible



The salesman showed her that she could earn twice as much with the electric washer and would save her strength for her home and children.

for her to finish the washing more quickly and to take in more. She has been able to support her little family and to do it without leaving her home. That woman is convinced that an electric washing machine is a good investment.

### "Old Machines for New" Are Bound to Boost Washer Sales

Those people who now own washing machines are excellent prospects for something a little more recent or a little better. If they can be persuaded to trade-in the machines they have and buy a brand-new machine, then those trade-ins actually can be rebuilt at a small expense just as typewriters and cash registers are rebuilt, and the rebuilt machines can be sold at a fraction of the original cost although they are in a condition such that they will render several years of good service. In this manner the washing-machine field can be expanded very greatly. Those who have bought used machines, in a good proportion of the cases, will buy new ones later on.

It has been found in the automobile business that used cars very greatly have increased the sale of new ones. People who otherwise would not buy a car at all buy a new one because all the neighbors have cars. Every other car in the vicinity may be a used car but this type of person is too proud to drive a machine that has been discarded by someone else, so he spends the money and buys a new one.

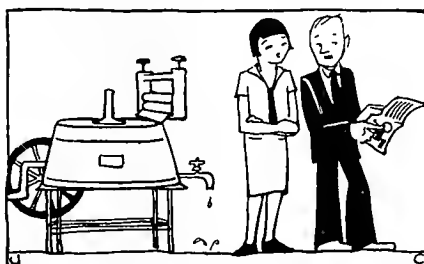
In the automobile industry the used-car business has been effectively instrumental in building up the market for automobiles. People who now own cars are encouraged to trade them in and get something better. Those who do not own cars are encouraged to buy a used one rather than get along without a car at all. Easy terms and reasonable guarantees are given with the used cars.

When we start making comparisons between the automobile industry and the washing-machine industry we are likely to hear some excuses from the man who sells washing machines.

There are various reasons why there has been such a great difference in the sales of washing machines and of automobiles. The difference in the number of prospects does not enter into the proposition, however. What does, is the difference in the methods of selling. It has been actually harder

for the average person to buy an electric washing machine than it is to buy an automobile.

Make it easy enough for people to buy and consider every family in the United States as a prospect and there is no reason why there should not be a greater number of washing machines in use than there are automobiles. The average investment in a washing machine is considerably less than the average investment one must make in an automobile. In addition, the automobile will wear out in five or six years if it is used regularly. The washing machine is a very much simpler piece of mechanism than the automobile. This greatly simplifies the problem of dealing in used machines. The washer can be given a complete overhauling, it even can be fitted with a brand-new motor and still keep the total cost of rebuilding down to the labor cost alone of giving an automobile as thorough an overhauling. Every-



"Lady, we'll take your old haywire model in on the first payment for this magnificent superb super-washer."

thing is in favor of the washing machine. The problem then simmers down to one of making it as easy to buy and placing the washing machine within the reach of as many people as is the automobile. This means that every person should be considered a prospect even after a washing machine actually has been purchased.

### Two Girls Decide to Go Into Business for Themselves

A couple of girls decided that they wanted to go into business for themselves. They bought an electric washing machine and an ironer and started a little home laundry. In the course of a few years they were able to build up a profitable little business. The electric domestic laundry machines on the market made this possible.

These two incidents show the folly of attempting to draw the lines between people who are prospects and who are not prospects for washing machines, or for other electrical appliances for that matter. If new uses can be found for these appliances, the



Who would have thought that Mary and Maud, two young girls, would buy a washer, and yet because they wanted a business of their own, they bought one and started a hand laundry.

market is extended automatically. Here we found a woman with no money and no sure income who bought an electric washing machine in order to make it possible for her to earn a living. If only those people with sufficient in-



"Why, Mum, they's not many houses these days that don't have an electric washer. and I for one ain't anxious to work where they ain't none."

come to pay for a washing machine had been considered as prospects, it is quite evident no sale would have been made to her. In the other case the sale was made to a couple of unmarried girls.

The sale of washing machines appears to depend more upon the attitude the salesman takes than upon the income of the people to whom he attempts to sell.

### Servants Demanded a Washing Machine and an Ironer

A woman in one of our western cities received the shock of her life not long ago. She is a woman who always had someone come in to do the washing and ironing and general housework. But she lost her faithful servant of many years, and when the applicants came to answer her advertisement for help they gave her the surprise of her married life. Each applicant for the job asked her if she had an electric washing machine, and most of them quit or did not even start to work for her when she revealed that hers was a household as yet unmodernized.

Get enough washing machines introduced and a condition sooner or later will arise which will force sales. Let all the washerwomen and servants begin to demand washing machines and people simply will have to buy them if they are going to retain any washerwomen and servants.

Again, get a few women who take in washing, that is, do all the washing at their own homes, to buy washing machines, and the competition these women offer will force other women who take in washing to buy washing machines. If these women are so situated that they cannot possibly buy new machines and there are used machines on the market, then they will buy used machines, but since they are using them steadily, it won't be many years before they have worn them out and they will have to buy new ones.

### Motion Pictures Used as Sales Promotion for Washer

A picture in which the story is built around an electric washing machine has been prepared by the Universal Pictures Corporation in co-operation with the Gainaday Electric Company and is being made available to dealers in that company's washer as sales promotion material.

"Little Giant," as the picture is called, features Glenn Hunter. The story deals with the tribulations of a young washing-machine salesman who must make good to win the girl of his



Poster which ties in the motion picture with the dealer of washing machines in his advertising efforts. This motion picture has been prepared by a nationally known producer in conjunction with the manufacturer of washing machines, and is designed for dealer tie-in with his local motion picture theater.

choice and is said to contain much humor and an interesting plot. In the picture the young man has an opportunity to sell the machine to a prospect, and in this manner the sales message is put before the movie audience.

Advertising material, contests, and other promotion material have been worked out to complete the tie-in between the dealer and the picture house. The plan has been used in many localities and is said to be productive of unusually fine results.

### Specials to Come Cast Their Shadows Before

In the columns of this Better Merchandising Section of the Journal of Electricity special treatment is to be given in forthcoming issues to a number of live merchandising problems. If you have ideas upon them, they will be as the breath of heaven—send them in by all means. Each of the following subjects will be considered carefully and searchingly:

1. The Trade-in or Used Appliance Problem—How successful merchandisers deal with it.
2. Training Appliance Salesmen—Some of the best methods.
3. The Electrical Dealer's Advertising—How much, when, and where he should place it.

Special sections will be devoted to the selling of small appliances, lamps and lighting, air heating, ranges, ironers and irons, and Christmas sales plans. Watch for them.

**Electric Washers and the Servant Problem.**—That servants cannot use electric washing machines is often given by housewives as a reason for refusing to buy a machine. In this respect it is interesting to note what Mary Armsbee Whitton, in a recent

number of Woman's Home Companion, has to say on the subject:

One of the modern housekeeping fallacies most frequently encountered, she writes, is the theory that electric household machinery is something that can be appreciated only by the intelligentsia, and that its operation is clearly beyond the comprehension of the ordinary hired household assistant.

This point of view sounds discriminating and judicious but is entirely contrary to a fairly

active, practical experience extending over a period of more than ten years. During this time I have yet failed to discover the domestic service worker who was too ignorant, or too obstinate, to be taught the use of all the regulation electric household devices, or who, having once been taught, did not give better service with machines than she could by using her old by-hand methods. Nor should it be assumed that my experience is in any way unusual, or that I have been dealing with a specialized and highly trained type of helper.

## Central Station Sells 1,012 Washers in Month

### Annual Washing-Machine Sale of Utah Power & Light Repeats Triumphs of Former Campaigns

The Utah Power & Light Company's annual washing-machine campaign, conducted during March, 1926, again proved to be one of the outstanding events of the year in the electrical industry. This company again set a quota of 1,000 machines and exceeded this quota, as has been done in every similar campaign which it has conducted for the past twelve years.

The total reached during the campaign of March, 1926, was 1,012 machines. This figure, while not as high as in some previous campaigns, is remarkable in view of the fact that a greater degree of saturation is reached each year and that in addition the company's sales organization is confronted with much more competition each year.

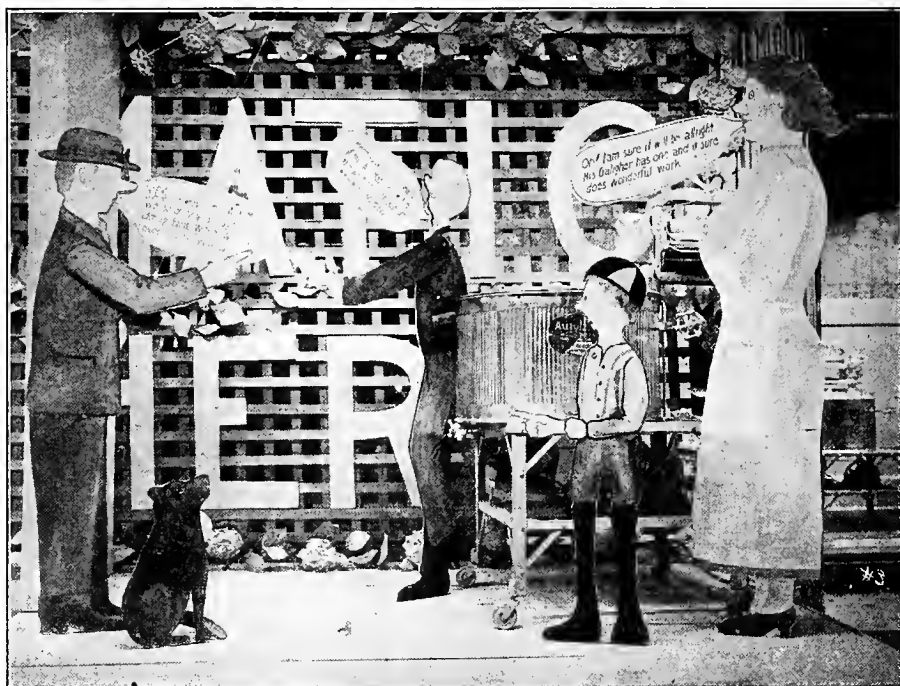
Generally speaking, the March, 1926, campaign was conducted along lines similar to those of the past. The most important new feature introduced, and one which brought very good results, was the participation of a goodly number of the company's employees in the selling activities, in addition to its regular sales organization. Prior to the campaign a circular letter and broadside were distributed to each employee, outlining an attractive offer, consisting of liberal commissions based on the number of machines sold by them. The company's house organ, "The Synchronizer," also carried a full

explanation of the plan and an editorial urging employees to participate. Approximately 400 machines were sold by such employees, about 125 taking part in the campaign.

The famous slogan, "A Copper Washer for a Silver Dollar," again was adopted as the keynote for the sixth successive time, and once more proved to be a very effective method of attracting attention to the company's great annual event. This slogan has become identified so completely with this particular activity in the minds of the public that its value seems to increase each year.

Newspaper display advertising was used to considerable extent, as heretofore, in addition to direct-by-mail broadsides, billboards, window displays and special "stunt" features.

A series of "peppy" sales letters, featuring aeroplane altitude flights, was prepared, a letter each day being sent to division managers and sales people. Each of the company's ten divisions was assigned a mythical aeroplane, with an appropriate name, and the total of washing machines sold each day in all divisions represented the altitude reached for that day, 10 ft. being allowed for each machine sold. Relative standing in the race was determined in accordance with the percentage of quota reached by each division each day.



Andy Gump, the famous cartoon character, was enlisted, by means of cut-out figures, in window displays during last year's washing-machine sale of the Utah Power & Light Company. An entire series of these cartoon windows was used, showing Andy in varying stages of being sold a washing machine.

The usual terms of \$1 down and \$5 per month which have prevailed in a number of previous washer campaigns conducted by this company were again in effect.

In previous campaigns the use of banners displaying the slogan was adopted. Company automobiles carried these banners on their trips to all parts of the various towns, and the city street cars also carried the message in the form of large banners on each end.

The small boy did his part by wearing a skull cap bearing the slogan.



Starting the campaign was a sales breakfast, given the sales staff just before the zero hour. A few minutes following this scene this same staff went over the top upon this year's campaign.

Several thousand of these caps were distributed to the enthusiastic youngsters.

Direct-by-mail advertising was used last year in distributing to all of the company's customers the "Automatic Oracle," a novelty designed in such a way that the customer could ask a number of questions regarding the automatic washer, and by means of a magnetized dial and pointer receive

the answer. The backs of billing envelopes also were used to carry a message regarding the campaign.

With total sales of 1,265 machines for the month, the Utah Power & Light Company established for its March washing-machine campaign last year the second highest figure in the company's history. This figure was exceeded only in March, 1920, when 1,711 machines were sold. This company's remarkable success in its annual washing-machine campaigns is attracting the attention of the entire country, and that year was no exception. In the face of a fairly high percentage of saturation in some districts and unusually keen competition, the selling of 1,265 machines at retail by the power company, which is undoubtedly a much greater number than has been sold by any other concern in one month in the entire country, is a striking example of results obtained by intensive sales efforts.

Few, if any, merchandising events of any description arouse the enthusiasm and interest of a sales organization to as great an extent as does this annual event on the program of the Utah Power & Light Company. Not only does this spirit prevail among the sales people, but almost the entire personnel partakes of it.

In the Salt Lake division this year a novel feature was the opening of the drive with a breakfast bright and early Monday morning, March 1. The members of the sales force of this division, together with a number of officials, were guests of the company on this occasion. Enthusiasm ran high, and a good start thus was obtained.

Keen interest was maintained throughout the company's entire organization during the entire period of the campaign, and the public at large



A billboard telling of the annual washing-machine sale of the Utah Power & Light Company.

seemed once more to grasp the "copper washer for a silver dollar" idea in a most gratifying manner.

Courtesy Card Brings Back Customers.—A touch of courtesy makes the whole world pleasanter. One progressive merchant not long ago conceived an idea that the individual courtesy of his clerks could be enhanced and the customer made to feel a personal interest in the store and in the clerk by the use of a card. The card was given to the customer or wrapped up in his bundle of merchandise purchased. In text it was as follows:

MR. A. R. SMITH  
Served You

In charge of  
Radio Department  
J. Q. Jones Electric  
Company

Will Be Pleased  
To Serve  
You  
Again

**Your opportunity to own an**  
**AutoMatic**  
Electric WASHER  
**ends on the stroke of 6 tomorrow night**

**UTAH POWER & LIGHT CO.**

**SHATTERING ALL RECORDS**  
Such popularity must be deserved!

**This Is Unbeatable Proof of Popularity**

**\$1 DOWN \$135.00 5 MONTHS**

**UTAH POWER & LIGHT CO.**

**Again**  
**A Copper Washer for a Silver Dollar**  
**Our Great Annual Event!**

**\$1 down**

**down**

**During March Only**

There are more AutoMatics in service in this territory than of all other makes combined

On Monday we begin our  
**FOURTEENTH ANNUAL SALE**  
of the MARVELOUS  
**AutoMatic**  
Washer

REMEMBER: Back of every washer we sell is our guarantee and our well known service

**UTAH POWER & LIGHT CO.**

**The Last Three Days of Your Golden Opportunity**

1926 MARCH 1926

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31					

**293031**

**AutoMatic**  
Electric WASHER

**\$135 DOWN \$121.50 CASH PRICE**

**THE WORLD'S GREATEST VALUE IN WASHING MACHINES**

**\$1 Down \$5 a month**

**BUY YOUR AUTO Matic NOW**

Some of the effective newspaper advertisements which brought results in the annual washing-machine sale of the Utah Power & Light Company, both in this year's and last year's campaigns. During the past thirteen years, one advertisement states, the company sold 19,257 washers. This sale has become an annual event in the territory served by the company.

# NEWS OF THE INDUSTRY

## Commissioners on Uniform State Laws Favor Indeterminate Permits for Utilities

A long step forward toward national unification of public utility legislation, especially as it pertains to franchises, was taken in Denver recently during the annual meeting of the National Commissioners on Uniform State Laws when the commissioners went on record in favor of "indeterminate permits" for public utilities. So far as the utility industry is concerned, the action was the most important taken during the session. It was of especial interest in Colorado where much confusion has existed for years because of a conflict in state laws growing out of the constitutional provision for "home rule" cities, in which public service organizations are under local instead of state commission regulation.

Action on the "indeterminate permit" idea in public utility legislation, designed to eliminate the present system of giving franchises for a fixed number of years and to authorize utilities to operate permanently under conditional permits issued by state public utilities commissions, came up during consideration of a proposed uniform utility act. While lack of time prevented final consideration or approval of the entire act at this year's conference, the commissioners definitely voted in favor of the permit plan and instructed the committee in charge to use this as a basis for its act in presenting it again for final action next year.

The act as a whole aims at uniformity in regulation of public utilities in all their relations with the public.

The "indeterminate permit" feature would continue franchises once granted until such time as the holder failed to fulfill its obligations properly or until its properties were purchased by the municipality affected.

Commissioners F. E. Curley of Arizona and Dix H. Rowland of Washington were the leading proponents of the measure, which occasioned considerable division among those voting.

"It is the only fair way to handle the matter," said Commissioner Rowland. "A public utility ought not to be required to junk its plant and cease operations when its franchise expires. When the utility has put its funds into the business, why shouldn't it be permitted to continue to operate or, as an alternative, the city required to buy it out?"

Opposition to the measure was headed by Judge James F. Ailshie of Idaho who said:

"To my mind it's a dangerous innovation. It amounts, in effect, to a permanent franchise. The constitutions

of many of the states forbid it and it is a principle which ought not to be adopted. It has been the principle for years that there ought to be a limit on such things." He contended that the only method of ending or terminating such franchises would involve purchase of the utility by the city in which it operated. It also was argued by opponents of the act that it would tend to create municipal ownership of utilities.

Proponents of the provision asserted that it was necessary to protect investors in public utilities securities and also to insure cities continued efficient service.

The purpose of the uniform utilities act as a whole is defined in its introduction:

"Our larger utilities are no longer merely local plants. They probably cross at least one state line and possibly two or more. Uniformity of regulation in the several states served by any one utility will inevitably be reflected in decreased operating costs, improved service and probably either increased dividends for stockholders or decreased charges for consumers; or both.

"Furthermore, state regulation of the public services has become an established institution which is destined to develop in scope during the next several decades. The development will follow the present gradual increase in the number and extent of public utilities and the growing importance of their position in our economic and social structure. The state regulatory acts have now been in existence a sufficient time for there to be a considerable volume of court decisions construing them. The public is awakening to the principles which must govern regulation."

Duties and regulations imposed upon utilities by the provisions of the act include the following:

All rates must be just and reasonable.

Every utility shall furnish adequate, efficient and reasonable service.

Every utility shall file a schedule of rates with its state utilities commission.

No utility shall depart from the schedule.

No utility shall grant unreasonable preferences, or maintain unreasonable differences, in rates or service between localities or classes of service.

No change in rates shall be made except on thirty days' notice to the commission.

No new construction or extension of service, with certain exceptions, shall be entered upon without a certificate of convenience and necessity first being obtained from the commission.

## Los Angeles to Vote on Bond Issues of \$21,000,000

Bond issues totaling \$21,000,000 for the use of the city's water and power departments will be submitted to the voters of the city of Los Angeles at the Aug. 31 primary election. Of this total \$11,000,000 is for the power department and \$10,000,000 for additional water and water-distributing facilities.

E. F. Scattergood, chief electrical engineer for the Bureau of Power and Light, in explaining the purposes for which the funds from the power bonds would be issued, outlined three major expansion programs which are called for at the present time. These programs are:

1. Development of 28,000 hp. additional hydroelectric energy along the Owens River aqueduct.

2. Acquisition of rights-of-way and the construction of tower lines and two new electric stations as a part of a high-voltage transmission system which ultimately will encircle the city.

3. Purchase of privately owned electric distribution lines in recently annexed districts.

Mr. Scattergood also mentioned the fact that independent of this bond issue a standby steam plant of 33,000 hp. capacity is to be constructed by the Bureau immediately upon receipt of materials and equipment.

The Southern California Edison Company has requested that the city of Los Angeles be enjoined from building this proposed steam plant, contending that the city in so doing is acting in violation of the contract now existing between the city and the Southern California Edison Company. (Journal of Electricity, July 1, 1926, p. 28.)

Of the \$11,000,000 for the power department, the larger items cover additional water storage, \$1,500,000; completing generating plant No. 1, \$1,250,000; rights-of-way for new high-voltage line, \$3,700,000; acquisition of new lines, \$2,000,000; other items include additional equipment and facilities for the distribution system.

In the water department \$6,000,000 of the \$10,000,000 is to be used for the purchase of additional water-bearing lands in the Owens Valley in the vicinity of West Bishop and Round Valley. The additional land to be secured by this purchase, it is stated, will give the city complete ownership of 90 per cent. of all water-bearing land in the valley and is expected to mark the end of the feud between the city and the Owens Valley ranchers. The remainder of the fund required for the water department is for new mains, trunk lines, storage facilities, etc., for this year and next year.



## Outside Services of City Plant Subject to Commission

An important decision on public-utilities matters was rendered recently by the Supreme Court of Colorado when it handed down a decision to the effect that when a city owning a public utility goes outside its own boundaries and provides service for suburbs, other towns or cities, or merely private individuals, the public utilities commission has the same power over those outside services that it has over a private corporation.

The decision was rendered in a case which has been in litigation for about three years between the city of Lamar and the town of Wiley, Colo. At that time the light and power company that, under private ownership, was serving Lamar was purchased by that city. While privately owned the power company had made a 20-year contract also to serve Wiley, which used the power for pumping in its municipal water system. After the purchase the city raised the rates for service to Wiley, and the town brought suit in the district court of Prowers County to force Lamar to recognize the contract it had assumed when buying the power plant from the private corporation. The case was decided in favor of Wiley, and Lamar appealed to the Supreme Court.

That court decided, in an opinion by Justice John Campbell, that when Lamar sold power to a neighboring town it was acting just as would a private corporation, and the public utilities commission would have jurisdiction. The commission has no jurisdiction over the rates charged to citizens of Lamar, because these citizens are, in the last sense, the rate-making power themselves, since they have the power to elect and remove municipal officers who make the rates. But since the citizens of Wiley have no voice in the choice of Lamar city officials, the public utilities commission, as an agency to enforce justice between public interest, has the power of rate control.

For this reason and because the city of Lamar satisfied the public utilities laws in filing with the commission its schedule of rates, and because at that time the town of Wiley made no protest, the contract is not binding upon Lamar, the high court held. However, Wiley at any time can file before the public utilities commission a complaint against the rates, and, after a hearing, the commission can readjust the rates.

## Steel Works Electrification Nearly Completed

The new \$1,500,000 electrification project for the steel works of the Colorado Fuel & Iron Company, Pueblo, is just about completed, and indications are that preliminary tryouts on the power house will be made soon, according to information received from officials of the company. The change from steam to motor drive will take place gradually with the minimum of interruption, and it is estimated that by fall the complete change will have been made.

With but one exception, that of the reversing blooming mills, every rolling mill and the rail mills are undergoing electrification, and it is said that this is the biggest application of electric drive to steel-mill work west of the Mississippi River.

The plant, which has a capacity of

approximately 40,000 hp., is considered one of the most modern in any steel works in the country. Engineering was done by Wilfred Sykes, consulting engineer of Chicago, and the entire electrical equipment is being furnished and installed by the General Electric Company.

## New 85,000-hp. Unit Completed at Long Beach Steam Plant

Completion of unit No. 9 of its Long Beach steam plant has been announced by the Southern California Edison Company, Los Angeles. This, the third large unit to be constructed at Long Beach in less than two and one-half years, is to have a maximum capacity of 85,000 hp., which will bring the total capacity of the plant to 305,000 hp. and make it the largest steam generating plant west of the Mississippi River.

The turbine was built by the General Electric Company and the condenser was furnished by the Westinghouse Electric & Manufacturing Company. Connelly boilers were installed. Power is generated at 13,800 volts and stepped up to 60,000 volts. The turbine was built to operate at 400 lb. pressure and 725 deg. temperature. The seven boilers are equipped with Bailey water-cooled furnace walls to prevent heat loss due to radiation. Economizers and air preheaters have been installed to reclaim heat ordinarily lost in the flue gases. Burners capable of using either gas or oil for fuel were installed.

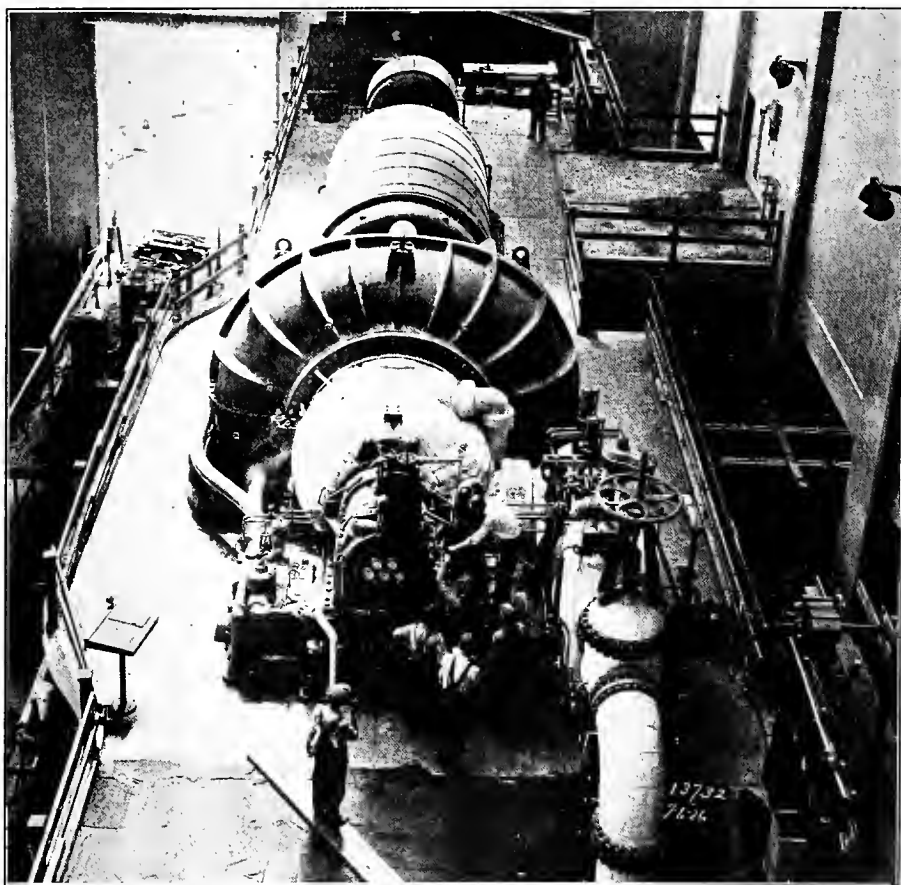
Stone & Webster, Inc., acted as engineers on the project and in completing the work in less than eleven months created a new record for speed and efficiency. The total cost has been set at \$5,500,000.

## World Power Sectional Meeting at Basle Aug. 31-Sept. 12

The technical program of the sectional meeting of the World Power Conference, to be held at Basle, Switzerland, Aug. 31-Sept. 12, will deal with five main subjects. These are: Utilization of Water Power, and Inland Navigation; Exchange of Electrical Energy Between Countries; The Economic Relation Between Electrical Energy Produced Hydraulically and Electrical Energy Produced Thermally—Conditions Under which the Two Systems Can Work Together with Advantage; Electricity in Agriculture; Railway Electrification.

Of the paper contributed by the American group, the first three subjects listed above will be covered by Col. Hugh L. Cooper; Col. William Kelly, director of engineering for the National Electric Light Association; W. E. Mitchell, vice-president, Alabama Power Company, and John M. Gallalee, of the University of Alabama. Dr. E. A. White, director, Committee on the Relation of Electricity to Agriculture, has prepared a paper on "Electricity in Agriculture," W. S. Murray one on "Railway Electrification," and N. C. Grover and John C. Hoyt have collaborated on "National Aspects of the Study of Water Reserves."

O. C. Merrill, executive secretary, Federal Power Commission, is chairman of the American group. John W. Leib, vice-president, and general manager, New York Edison Company, has been chosen to preside at the Sept. 6 session, in accordance with the request of the Swiss committee which requested the American group to select the presiding officer for that date.



The new 85,000-hp. turbine recently installed in the Southern California Edison Company's Long Beach steam plant.

### Suit Filed in Protest Against East Bay District Permit

Based on the assertion that the water supply of the San Joaquin watershed is inadequate to care for its own needs, suit has been filed in the superior court of Amador County, Calif., against the East Bay Municipal Utility District, Paul Bailey, acting director (at that time) of the state department of public works, and Edward Hyatt, Jr., chief of the state division of water rights. The plaintiffs are the Rindge Land & Navigation Company, Delta Farms Reclamation Districts Nos. 2,024-2,026, 2,028, 2,029, 2,042 and 2,044, and California Delta Farms, Inc. The suit embodies the request that the permit for the appropriation of 375 sec.ft. and 217,000 acre-ft. per annum of the waters of the Mokelumne River for power purposes recently granted the East Bay Municipal Utility District (*Journal of Electricity*, July 1, 1926, p. 29), be reviewed and denied.

The complaint states that the district filed with the division of water rights application for permit to appropriate unappropriated waters of the Mokelumne River, and protests that the district has not shown that there are any unappropriated waters in that river. Other grounds of protest cited are:

That the quantity of irrigable lands in the San Joaquin Valley is greatly in excess of any quantity of water which ever will be available for their irrigation; that the water of the Mokelumne River when totally conserved, distributed and applied to an economic and beneficial use in Calaveras, Amador, San Joaquin and Contra Costa Counties will not be sufficient for the future needs of those localities; that a large portion of the lands which are tributary to and which are irrigable and are near the Mokelumne River are subject to serious flood hazards from annual floods; that throughout the area mentioned thousands of acres of land are irrigated by pumping from underground reservoir and therefore the demands of reservoir have not been considered in determining the amount of unappropriated water in the Mokelumne River.

Three different times the complaint points out that the district can go for a water supply to other places where an over-supply of water now exists.

**Applications for Water Rights in Ambitious Power and Irrigation Development Cancelled.**—Seventeen applications of W. H. Sampson, Corning, Calif., for permission to divert several hundred second-feet of water from the Trinity River in Humboldt and Mendocino Counties, Calif., through a series of tunnels into Clear Creek, a tributary of the Sacramento River, have been cancelled by the Division of Water Rights. The project, which also contemplated irrigation of the western side of the Sacramento Valley from Red Bluff almost as far as Woodland and was estimated to cost \$25,000,000, was described by state officials as "the most ambitious scheme of power and irrigation development to be presented in formal applications to the state water division." The cancellation resulted from Mr. Sampson's failure to appear at a hearing on the applications and to explain subsequently why he did not appear. At the same time

that the division cancelled Mr. Sampson's applications it granted four permits to the Humboldt Placer Mining Company for 150 sec-ft. from tributaries of the Trinity River for mining. These applications were in direct conflict with those filed by Mr. Sampson.

### Columbia River Commission Holds Organization Meeting

An organization meeting of the Columbia River Commission recently was held in Spokane. Dr. Elwood Mead, Commissioner of Reclamation, was elected chairman. Dr. Mead represents the Secretary of the Interior on the board.

An act of Congress passed at the recent session provides that the Secretary of the Interior may co-operate with the state of Washington, Idaho, Oregon and Montana in the allocation of the waters of the Columbia River.

One of the purposes of the study is to determine the amount of water supply necessary for the Columbia Basin Irrigation project. The board will undertake economic and other investigations, including the power possibilities of the stream. Another object is to report on the type of district organization best suited to handle the reclamation project.

### Zinc Electrolytic Plant to Be Built.

Announcement of a \$1,000,000 zinc electrolytic plant to be constructed at Kellogg, Idaho, by the Bunker Hill and Sullivan Mining Company during the next year, was made at Spokane recently. The first unit will have a day-and-night capacity of 50 tons of electrolytic zinc. A new process developed by the staff of the Bunker Hill and Sullivan Mining Company, which has a co-ownership with the Hecla Mining Company in the Sullivan company, will be used. This Tainton method will be given its first practical tryout in the new electrolytic plant. The Coeur d'Alene mining district as a lead producer has few equals in America, and the electrolytic process now to be used for zinc will put that metal on an equal basis in the district.

**Town Votes to Sell Plant to Cement Company.**—At a special election held in Gold Hill, Ore., recently the voters by a vote of 155 to 93 accepted the proposition of the Beaver-Portland Cement Company for the purchase of the municipal electric light plant according to press report, thus refusing the counter offer of the California-Oregon Power Company. The cement company offered \$22,600 for the plant, with an option to purchase in five years. The power company offered \$40,000 outright, with a promise to begin construction of a new plant within a year. The city plant was for sale and had been opened to competitive bidding.

**Edison Company to Sell Additional Stock.**—Southern California Edison Company has been authorized by the California Railroad Commission to issue and sell on or before June 30, 1927, 400,000 shares of its Series B 6 per cent preferred stock of the aggregate par value of \$10,000,000, and to use the proceeds thereof to finance uncapitalized expenditures as of April 30, 1926, and to reimburse its treasury on account of retiring bonds in the amount of \$974,165.97.

### Refrigeration Industry Bans Unethical Advertising

For the purpose of attempting to remedy a situation which has developed as a result of the growing tendency on the part of manufacturers, distributors and dealers of both ice and electric refrigeration to use advertising and publicity attacking the other's methods a conference was called by the National Association of Ice Industries in Chicago recently. The meeting was attended by representatives of large ice companies and manufacturers of electric refrigerators, the American Association of Ice and Refrigeration, the National Association of Ice Industries, the Society for Electrical Development, and the Electric Refrigeration Council, the latter being an organization of electric refrigerator manufacturers now in process of formation.

At the meeting examples of negative advertising which have appeared recently in the form of newspaper advertisements, booklets and letters were reviewed and discussed. Advertisements emanating from both industries, making disparaging references, and in many cases, positive misstatements of fact, were pointed out. It was agreed generally among those present that all advertising of this class is not only ill-advised but also fruitless and unprofitable and a positive waste of money and effort.

It was pointed out that the common problem of both industries is to educate the public to a broader appreciation of the necessity for food protection through adequate refrigeration.

After a thorough discussion of the subject a resolution was adopted to the effect that the representatives of the associations and individual companies present went on record as being opposed to the practice of devoting space to unethical and unwarranted attacks by one industry upon the other; that they pledged themselves to use their influence to bring about the abatement of such advertising; that newspapers and magazines be requested to refuse it; and that advertising agencies and publicity writers be urged to use constructive methods only in presenting the subject to the public.

### Brighton-Merced Line Placed in Operation July 6

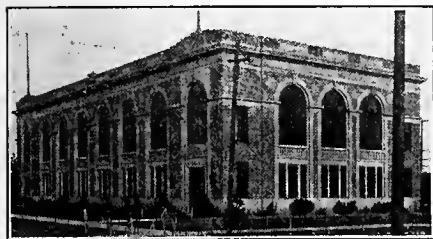
The new Wilson substation of the Great Western Power Company of California and the Brighton-Merced 220-kv. line were placed in operation July 6. The completion of this line will enable the Great Western company to interchange energy directly with the San Joaquin Light & Power Corporation. All equipment has been provided for 220-kv. operation, but the line is operating at 165 kv. at present. (*Journal of Electricity*, July 1, 1925, p. 34, and Oct. 1, 1925, p. 261.)

The substation is located a mile and a half southeast of Merced, Calif. Outdoor equipment consists of a bank of 90,000-kva. transformers and necessary switch gear and equipment. A condenser of 25,000-kva. capacity is located indoors, together with control and metering equipment. Electrical equipment was rushed to completion in advance of the substation structure in order that the line might be placed in operation, so that the station itself is not quite finished. It is expected to be completed early in September.

## Residence District Station Well Designed Architecturally

One of the latest automatic substations is the East Pine Street station of the Puget Sound Power & Light Company, Seattle, placed in service early this summer. Being in the heart of a better class residential district of the city, its architectural features were given considerable care in designing the building, with the result that the structure is a credit to its surroundings and has received much favorable comment from the residents of the neighborhood.

Planned for an ultimate capacity of 30,000 kva., the station now has installed two 3,000-kva., 3-phase, 13,200 to 4,000-volt transformers. It is fed by two primary feeders, and provision



Situated in one of Seattle's residential districts, special attention was given to the architectural features of this automatic substation.

is made for a total of four, while two 3-phase power circuits and thirteen single-phase residential feeders radiate from it. The single-phase secondaries are regulated, and one reserve regulator with transfer bus system is provided to transfer any feeder to the reserve regulator if necessary.

Automatic features of the station include elaborate arrangements for taking care of various emergencies and of the changing conditions of ordinary operation. One primary feeder acts as preferred and the other as auxiliary. In case of the failure of the preferred, the circuit breaker automatically opens and the auxiliary is cut in through the bus junction breaker. These lines are protected by reverse phase and low-voltage relay equipment. The transformer banks are protected differentially and thermally. One is held in reserve and is brought in automatically when the load on the main bank reaches 110 per cent capacity, cutting out again at 95 per cent. The reserve bank cuts in instantaneously in case of failure of the other bank through differential operation. The secondary feeders are equipped with reclosing equipment operating on a cycle of three reclosures before locking out in case the trouble continues to exist.

## Call for Road Bids Forecasts Bridge River Plant Work

Commencement of the Bridge River development project is foreshadowed by the announcement that the British Columbia Electric Railway Company has asked for bids on the construction of a road from Bridge River station to the site of the portal of the proposed tunnel through Mission Mountain in connection with its proposed \$30,000,000 hydroelectric installation at that point, the first unit of which is scheduled to be put into operation in 1930. (Journal of Electricity, Oct. 15, 1925, p. 305.) The distance from Bridge River station

to the site for the portal of the big bore is 8½ miles. A subsidiary company, the Bridge River Power Company, has been formed to undertake the construction of the new plant.

The company also has let a contract for the completion of its Alouette-Stave Lake plant to the Northern Construction Company for a sum closely approximating half a million dollars. The work is to be commenced at once and to be completed by the end of this year.

## Harvard Advertising Awards to Cover Industrial Products

An award of \$2,000 will be given for the first time this year as a part of the Harvard advertising awards for the advertising campaign of the year coming under the consideration of the jury of award as the campaign most conspicuous for the excellence of its planning and execution that seeks publicity for industrial products primarily through the media of industrial, trade, or professional journals.

Industrial products seeking publicity through general popular magazines may compete for the award of \$2,000 given for the best national campaign, either of an institutional character or devoted to the advertising of specific products.

The Harvard Advertising Awards were founded by Edward W. Bok in 1923 and are administered by the Harvard Business School. Awards are made annually, and advertising material to be considered for the current year must be received by the secretary of the Harvard Business School on or before Dec. 31, 1926.

## Diesel Engines Prove Efficient.—

Running continuously for 720 hours at rated speed of 95 r.p.m. under full load of 2,900 hp. and immediately swinging into a series of special tests is the record established by a 4-cylinder Shipping Board diesel engine built by the Worthington Pump & Machinery Corporation. The special tests included 6 hours at 10 per cent overload and 95 r.p.m., 4 hours at 10 per cent overload and 100 r.p.m., 6 hours at three-quarter load, 4 hours at one-half load, 2 hours at one-quarter load, 1 hour at full speed astern, and 1 hour of special maneuvering. The engine ran steadily through the trials with no adjustments and free from vibration or laboring. Fuel used amounted to only 0.462 lb. per brake hp. hr., and lubricating oil needed was only 15 gal. per day for all purposes. The average fuel tested 60 deg. Baume gravity, 177-deg. flash point and 270-deg. burning point.

Utah and Colorado Agree on Colorado Water Division.—In anticipation of a final authorization of Boulder dam, Representative Taylor of Colorado recently introduced a bill in Congress authorizing the states of Utah and Colorado to enter into a compact governing the use of waters in streams that flow from one state into the other. It was passed. A similar bill recently was passed in the Senate authorizing Idaho and Wyoming to form a compact governing interstate streams. Senator Kendrick has proposed similar bills under which Wyoming may enter into similar compacts with Colorado, Nebraska and Montana.

## Civil Engineers Discuss Power Situation in Northwest

The various power plants of the Northwest and the general power situation of that region were the main subjects dealt with at the session of the power division of the American Society of Civil Engineers at its summer meeting in Seattle July 14-16.

Among the subjects discussed were: the present power situation in Washington, which was reviewed by Prof. C. W. Harris of the University of Washington who stressed the importance of the small hydro development; the Lake Cushman development, the details of whose design and construction were presented by J. L. Stannard, chief engineer of the project; and the Chelan hydro development, which was described by Victor H. Greisser, chief engineer, The Washington Water Power Company. An interesting feature of the session was the comparison made by W. D. Shannon, general superintendent, Puget Sound Power & Light Company, between the Lake Cushman and Baker River projects, which have many points of similarity. Further development of three power sites on the Skagit River by the city of Seattle was reviewed by Joseph Jacobs, consulting engineer of that city.

Of particular interest was a moving picture of the experimental arch dam built by Engineering Foundation on Stevenson Creek in California. H. W. Dennis, construction engineer, Southern California Edison Company, explained the pictures as they were shown.

## Coffin Award for Contributor to Art of Lamp-Making

Marvin Pipkin, chemical engineer in the lamp development department of the National Lamp Works of the General Electric Company at Nela Park, Cleveland, has been awarded the Charles A. Coffin Foundation Award in recognition of meritorious service in the development of better illumination.

Mr. Pipkin's contribution to the art of lamp-making consists of perfecting a process for making strong, inside frosted lamp bulbs strong enough to supersede clear bulbs. Previous processes for frosting bulbs on the inside left them in a weakened condition and easily breakable. All Mazda lamps now are being made with an inside frosting which reduces glare and also gives more light than outside frosting. The new lamps have a pearl-gray appearance which takes on the color of any background, blending and harmonizing with fixtures, shades and surroundings.

Two Small California Utilities Apply for Permission to Sell.—Alturas Electric Power Company, operating in the city of Alturas and vicinity, Modoc County, Calif., and Mendocino Electric Light & Power Company, operating in the city of Mendocino and vicinity, Mendocino County, have filed a joint application with the California Railroad Commission for authority to sell, and Peoples California Hydro-Electric Corporation for authority to purchase and operate the properties of the former, and to issue \$57,000 of its capital stock and \$130,000 of first mortgage bonds in payment therefor.



## Opposition to Proposed General Survey of Rivers

Washington Correspondence

Very general opposition is being evidenced toward the proposed general survey of rivers as proposed in the rivers and harbors bill. In compliance with a provision in the 1925 rivers and harbors bill, the chief of engineers furnished a long list of important rivers on which engineering data are incomplete. Major-General Harry Taylor, under whose direction the report was made, fears that the opening of general surveys on many rivers may result in demands that development be postponed until the survey is finished. The surveys necessarily would proceed slowly as the appropriations, in all probability, would be quite limited.

American Engineering Council is opposed to the surveys, and O. C. Merrill, executive secretary of the Federal Power Commission, thinks the whole water-power industry is against the provision as it appears in the pending bill.

Mr. Merrill long has been urging that Congress authorize the expenditure of license fees for river surveys as provided in the act. At present the license fees are being converted into the treasury as miscellaneous receipts. He thinks, however, that these studies should be confined to rivers about to be developed or on which some question has arisen. The actual work would be done by the Corps of Engineers and the U. S. Geological Survey.

The river and harbor bill is on the Senate calendar but an effort will be made on the floor at the December session to amend the paragraph providing for the surveys.

## Woman Wins Prize in Convention Light-Painting Contest

Mrs. Hearne Adams, wife of a salesman for the Electrical Household Utilities Corporation, Chicago, has been awarded \$100 in gold, the prize for "painting" most effectively the "Lady of Light" at the National Electric Light Association convention recently held at Atlantic City.

Through the courtesy of Curtis Lighting, Inc., the "Lady of Light," a life-size wax figure, was presented within an iridescent shell on a beautifully draped studio stage. The guests were permitted to "paint" the setting with X-Ray color lighting equipment manipulated from a dimmer switchboard at the entrance to the studio. A score of switches, each having twenty intensities, controlled seven banks of concealed lights with more than seventy-five X-Ray reflectors and color screens. Over a million color combinations were possible, and each choice was recorded separately.

Three well known lighting men, S. G. Hibben, M. Luckiesh, and A. L. Powell, determined what in their opinion was the ideal combination of the color lights, and the prize was awarded to Mrs. Adams whose choice corresponded the most nearly with theirs.

**Technical National Section Changes Name.**—Engineering National Section is the title to be applied to the section of the National Electric Light Association formerly known as the Technical National Section. The change was adopted at the N.E.L.A. convention in Atlantic City.

## California Delegation Prominent at Hoover Convention

Garbed in white coveralls and tall sombreros and traveling in a special car, the California delegates to the sixth international convention of The Hoover Company at North Canton, Ohio, attracted much attention. Further attention was centered upon them in the big parade held during the convention when they presented as their float a covered wagon drawn by two steers, with the caption, "As Forty-niners we're headliners." The California delegation also won second place in the window display competition through the display made by Carl Shepherd.

The convention was held in two sections; one for salesmen July 6-10, and one for managers July 12-17. The average attendance for the two weeks was 500, including 31 from California points the first week and 14 the second week, and 24 from England, Holland, Switzerland and Sweden. One hundred and eighty-five "maximen," the honor men of the Hoover sales force, were present, having met the requirements of selling 25 Hoover vacuum cleaners and 25 sets of dusting tools each month for eight months.

Among the delegates from California were George M. Plover, R. R. Fleming, Wm. Diamond, F. B. Skinner, S. M.



This covered wagon with its '49ers, the float of the California delegation, attracted much attention in the parade at the sixth international convention held by The Hoover Company

Torrance, W. J. Kimes, L. R. Cahan, W. R. Chappalear, L. S. George, M. W. Johnson, D. M. Corcoran, F. J. O'Brien, I. E. Crow, C. B. Savage, C. F. Patty, W. A. Gray, Phil Claxon, B. L. Maranda, Carl Shepherd, D. P. Hoover, J. M. Lusher, Fred Meininger, R. L. Clark, P. C. Copeland, Lee Ragless, J. M. Taylor, J. Davidson, Ben Patterson and C. C. Collins.

**Record Large Machine Ordered by Eastern Utility.**—Having a continuous load rating of 160,000 kw. the new 60-cycle turbo-generating unit under order by the United Electric Light & Power Company of New York City opens a new chapter in the development of large machines. This equipment is to be supplied by the American Brown-Boveri Company and is to be installed in the Hell Gate station of the United company in New York.

**Pacific Gas and Electric Company to Purchase 60-kv. Line.**—Western States Gas & Electric Company has been authorized by the Railroad Commission to sell, and Pacific Gas and Electric Company to purchase for the sum of \$85,000 a certain 60,000-volt electric transmission line running from the vicinity of Valley Springs to Alta-ville, Calaveras County.

## Changes in Pacific Coast Staff Announced by McGraw-Hill

The following staff changes have been announced by the McGraw-Hill Publishing Company, Inc., for the Pacific Coast Division, effective July 1, 1926:

H. C. Worden has been appointed Pacific Coast sales manager for the Engineering and Mining Journal, Engineering News-Record, Chemical and Metallurgical Engineering, American Machinist, Power, Coal Age, and the Keystone Directories.

John W. Otterson, formerly business manager of the Journal of Electricity, has been appointed Pacific Coast sales manager for Electrical World, Electrical Merchandising, Radio Retailing, Journal of Electricity, Industrial Engineer, Electric Railway Journal, Bus Transportation, Radio Trade Catalog, Electrical Trade Catalog and Electrical Engineering Catalog. Mr. Worden and Mr. Otterson will assume joint responsibility for the sales for Ingenieria Internacional.

Roy N. Phelan has relinquished his duties on the editorial staff of the Journal of Electricity and been appointed assistant business manager of that publication. He also has been appointed secretary and treasurer of the McGraw-Hill Company of California.

W. A. Cyr succeeds to the duties on the editorial staff of the Journal of Electricity formerly filled by Mr. Phelan, and will give special attention to the development of the editorial work in connection with the contractor-dealer section of that paper.

Miss Ethel Jones has been promoted from the position of assistant news editor to news editor of the Journal of Electricity.

## Seattle Plans to Expand Light Plant and Extend Railway

The Seattle municipal light department has introduced into the city council three ordinances calling for appropriations of nearly \$1,500,000 to be used in enlarging the city light plant. Of this sum, \$700,000 is set aside for extensions to serve new customers, and \$495,000 for new street-lighting circuits, underground construction, relay system, commercial feeder at the Fremont substation, and the preparation of plans for a new substation to be built on Third Avenue between Spring and Madison Streets. The third ordinance appropriates \$225,310 for enlarging and increasing the capacity of the West Seattle James Street, North Seattle, Seventh Avenue and Spokane Street substations.

Extension of the Skagit River railway from its present terminus at Gorge Creek to Diablo Canyon, at a cost of \$350,000, is provided for in a bill also recently introduced into the city council. The present city railway extends from Rockport to Gorge Creek and cost in the neighborhood of \$1,800,000. The proposed extension is a fraction more than four miles in length.

**Irrigation District Applies for Power License.**—The Murtaugh Irrigation District of Artesian City, Idaho, has applied to the Federal Power Commission for a license covering its project on Snake River and Rock Creek. The initial installation will be two units of 5,500 hp. each.



## News Briefs

**Increase Reported for June in the Shipment of Industrial Trucks and Tractors.**—June shipments of electric industrial trucks and tractors, as reported to the Department of Commerce by the nine leading manufacturers in the industry, were 144, as compared with 108 in May.

**Colorado Utility Seeks Franchise Rights.**—Extension of the franchise rights to supply Hillrose and Morgan districts with light, heat and power recently was sought by the Public Service Company of Colorado in an application presented to the Public Utilities Commission.

**Franchise Granted Transmission Line in Pacific County, Wash.**—The Willapa Electric Company, Raymond, Wash., has been granted a 50-year franchise by the commissioners of Pacific County to erect and maintain electric transmission lines over a new series of county roads in that county.

**Yacolt, Wash., Buys Power System.**—The city of Yacolt, Wash., has purchased the property of the Northern Clarke County Light & Power Company which formerly served the town. The equipment purchased consists of a power plant, poles, meters and a system valued at about \$7,500.

**Arizona Sodium Company Applies for Permit for Power Project.**—The Arizona Sodium Production Company, of Phoenix, has applied for preliminary permit covering a proposed dam and reservoir on Aravaipa and Turkey Creeks, in Pinal and Graham Counties, Ariz. The power is intended for mining purposes.

**Index to Volume 56, Journal of Electricity, Available.**—An index to Volume 56 of the Journal of Electricity, covering numbers from Jan. 1 to June 15, 1926, inclusive, has been prepared and now is ready for distribution. Copies may be obtained upon request of the head office of the publication at 883 Mission Street, San Francisco.

**Transmission System License Granted Idaho Power Company.**—Land classification in Idaho and adjoining states finally has reached the point where the Federal Power Commission has the necessary data to embody in the license of the Idaho Power Company covering practically its entire transmission system. The license has been issued.

**L. A. Railway Installs Instruction Equipment.**—The entire equipment of the multiple-unit street car has been installed on the wall of an assembly room at the car shops of that company. A complete replica of a car-lighting system is installed on the ceiling of the same room. All piping and wiring is so arranged as to be easily traceable. All of the equipment is in operating condition and serves well in giving practical instruction in actual operation to the classes of men.

**Eastern Oregon Company Files on Grand Ronde River.**—Among recent filings in the office of Rhea Luper, state engineer, Salem, Ore., was that of the Eastern Oregon Light & Power Company, Baker, to appropriate water from the Grand Ronde River for the development of 1,364 theoretical horsepower, at an estimated cost of \$810,000.

**Pasadena Planning Installation of Ornamental Street Lighting.**—Plans are being laid to install ornamental lighting systems on West Colorado Street, Pasadena, Calif., between the west end of the Colorado Street bridge and Avenue 64 and on Avenue 64 between West Colorado Street and Annandale Road. The improvement calls for the installation of underground conduits, curbs and gutters and sidewalks.

**Fort Bragg Company Applies for Permission to Sell.**—Fort Bragg Electric Company has filed with the California Railroad Commission an application for authority to sell its properties to Peoples California Hydroelectric Corporation. In the same application the Peoples company asked for authority to take over the Fort Bragg system and to issue \$75,000 of capital stock, and first mortgage bonds of the face value of \$150,000.

**Ellensburg, Wash., to Purchase Energy from Puget Sound Company.**—After a year's discussion the city council of Ellensburg, Wash., has decided to enter into a contract with the Puget Sound Power & Light Company to purchase electric energy from the power company to fill the needs of the city in excess of the capacity of the municipal plant. The alternative was to install Diesel engines to increase the plant's capacity.

**Application for Toutle River Rights Rejected.**—The application of Henry W. Coe for rights on the head waters of Toutle River in Washington, including storage in Spirit Lake, has been rejected, on the ground of lack of market and interference with the scenic and recreational value of Spirit Lake. In addition, the water rights are involved in litigation. (Journal of Electricity, Jan. 1, 1926, p. 29, and March 15, 1926, p. 236.)

**Colorado River Compact Subject of Thesis.**—Announcement has been made by Dr. Ruel L. Olson that his thesis, "The Colorado River Compact," submitted for the degree of doctor of philosophy at Harvard University, shortly will be off the press. Four years were put into study of the Colorado River development by Dr. Olson, and the thesis it is said covers all phases of the problem, beginning with a study of the administrative law features of the compact.

**Duncan, Vancouver Island, B. C., Votes to Sell Lighting System.**—By an overwhelming vote the ratepayers of Duncan, on Vancouver Island, B. C., authorized the sale of the local electric lighting and water systems to the Duncan Utilities, Limited, a subsidiary of the International Utilities Corporation, which recently acquired the Nanaimo electric lighting plant and is now negotiating for the Kamloops and Vernon plants. (Journal of Electricity, June 15, 1926, p. 591.)

**Colorado Company Extends Lines.**—The Home Gas & Electric Company, Greeley, Colo., at present is extending its power lines a total of 7 miles in order to reach several industrial concerns and a large number of pumping plants in shallow-water districts. One 3-mile extension is being made into the Olive Branch country. Another 4-mile extension from the end of the Gill line into Galetton will serve this district and supply service for the new power dump of the Great Western Sugar Company at that point.

**Power Project Planned for Cross Creek in Clallam County, Wash.**—A \$500,000 hydroelectric power project is planned at Cross Creek, a tributary to Lake Crescent in Clallam County, Wash., according to Carl F. Uhden, formerly in charge of construction at the city of Seattle's Skagit plant. He has filed application for rights for a syndicate whose identity is not made public at this time. A 3,400-hp. plant is contemplated, the power to be used for industrial and mining purposes on the peninsula.

**Great Northern Railway Awards Contract for Substation.**—The Great Northern Railway has awarded contract to W. T. Butler, contractor, Seattle, for construction of a proposed substation at Skykomish, to cost \$45,000. The station is the first of two to be built by the company in connection with its electrification program from Appleyard to Goldbar. The structure will be 65 x 74 ft. in size, one-story and of reinforced concrete. The General Electric Company has contract for furnishing the substation equipment.

**City and Utility Not in Accord on Substation Price.**—Lack of agreement between the city of Seattle and the Puget Sound Power & Light Company over the price of two substations the city is about to buy from the company is evidenced by a resolution recently introduced in the city council directing T. J. L. Kennedy, corporation counsel, to take legal steps to compel the company to accept a price of \$119,000 for the two stations, one in West Seattle and the other on James Street. The price was fixed by a board of appraisers, but the company is asking \$185,000.

**Condemnation of Public Service Company's Loveland Plant Sustained by Supreme Court of Colorado.**—The Supreme Court of Colorado has sustained the condemnation of the power plant of the Public Service Company of Colorado in Loveland. The company had appealed against the authority allowing the city to take over its property. The court held that the determination of the city authorities as to what property should be taken for operation of the plant was conclusive, unless fraudulent or unreasonable; that damages to the remainder of a state-wide system by what was done elsewhere than on the part taken could not be considered; that every presumption was in favor of the award and its invalidity could be established only by clear evidence. Both the initial construction of the Loveland municipal plant and the city's right to operate it after completion were opposed by the Public Service Company.



## News of the Electragists



### District Five First Red Seal Home Is Completed

District five's first electric home was completed recently by Charles N. Parmenter of the Franklin Electric Company, Roseville, Calif. It was the home of J. Rogers of that city.



The home of J. Rogers, of Roseville, Calif., the first Red Seal Home built in District 5. Charles N. Parmenter was the contractor.

Mr. Parmenter is a member of the Central Sierras Electric League and active in the affairs of that organization. Other Red Seal homes in that district are said to be in prospect, according to H. S. Furlong, chairman of that district.

E. L. McCleary, of the McCleary-Harmon Company, electrical contractors of Detroit, was a recent San Francisco visitor. Mr. McCleary is a past president and past member of the executive committee of the National Electrical Contractors and Dealers Association, the forerunner of the Association of Electragists, International.

Charles Lyman, Commercial Electric Company, San Francisco, was in attendance at the quarterly convention of the California Electragists, Southern Division, which was held at San Diego.



M. T. Dacus, Electragist of Ontario, Calif., and member of the firm of Granger-Dacus Electric Company. Besides being an Electragist, Mr. Dacus is also a Lion and recently helped the brethren roar in the convention of the Lions International in San Francisco.

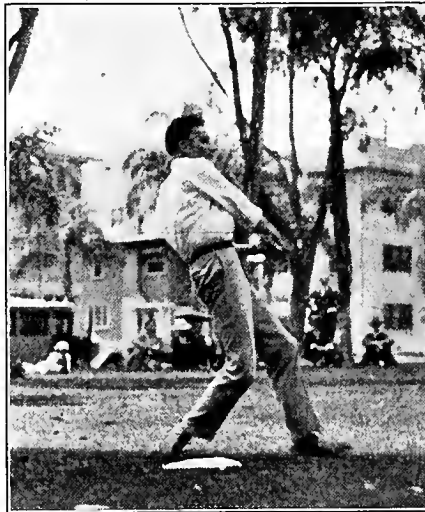
Deney Liyda has opened a new electric shop in Edmonds, Wash. Mr. Liyda formerly was manager of the Edmonds Electric Shop.

L. McGinnis has been elected secretary of the Electrical Contractors and Dealers Association of Sacramento, Calif., succeeding E. M. Miller.

E. Bedford of the Beverly Electric Store, Beverly Hills, Calif., has sold his interest in the business to J. L. Smith.

E. Bedford has sold his interest in the Beverly Electric Company, 1435 Santa Monica Boulevard, Beverly Hills, to his partner, J. G. Tozer, who will continue the business.

Hall Electrical Company and Direct Line Telephone Company have removed their office and store from 37 California Street to 285 Eddy Street, San Francisco.



C. J. (Cy) Geishush, executive secretary of the California Electragists, Southern Division, swings a mean bat! This snapshot was taken at the baseball game held during the recent meeting of the Electragists at San Diego.

The Apex Electric Shop of Salt Lake City recently moved to new quarters in its new building at 1029 East 21st South.

Robert R. Reid, contractor of Salt Lake City, formerly located in the McIntyre Building, has opened a new store under the name of the Reid Electric Company, at 35 Post Office Place. Mr. Reid intends to continue in the general electrical contracting business, featuring larger construction work.

The J. S. Walker Electric Supply, Inc., at 175 East Third South, Salt Lake City, Utah, has changed its name to Progress Electric Supply Company.

NePage McKenny Company, Seattle, has been awarded a contract for twenty-six ornamental street lighting standards for the Metropolitan Building Company in that city. This is the first part of an extensive lighting installation planned to light the area on which this company's buildings are located.

The Triple E Company, electrical equipment and engineering concern of Aberdeen, Wash., has been incorporated with capital stock of \$30,000 by P. A. Bertrand, formerly manager of the Grays Harbor Railway & Light Company, S. P. Phillips and Frank Thomas. Mr. Phillips and Mr. Thomas have been operating The Electric Store at 206 East Wishkah Street. This store will be continued and will be equipped to include electrical engineering and to handle large installations.

## Meetings

### Naval Radio Station Inspected by Electric Club

An especially interesting session of the Electric Club of San Diego, Calif., occurred July 27 when Gilbert W. Cattell, chairman of the club's Army and Navy relations committee, conducted a tour through the Chollas Heights radio station of the U. S. Navy.

Mr. Cattell secured authority from Washington to allow the tour and to arrange for the complete isolation of the station for the period of time consumed by the club's inspection. Competent guides took the visitors in small groups to all departments of the station. The Chollas Heights radio station is known as one of the most complete and important national radio telegraph units. Naval officers attached to the station were guests of the club at luncheon, which was served in one of the buildings on the government reservation.

### COMING EVENTS

Executive Committee, Northwest Electric Light and Power Association—

Meeting at Pacific Power & Light Company offices,  
Portland, Aug. 9, 1926

Association of Electragists, International—

Annual Convention—Cedar Point-on-Lake-Erie,  
Sandusky, Ohio  
Headquarters—The Breakers  
Aug. 24-27, 1926

Electrical Supply Jobbers Association, Pacific Division—

Annual Convention  
Empress Hotel, Victoria, B. C.  
Sept. 7-9, 1926

American Institute Electrical Engineers—

Pacific Coast Convention, Salt Lake City, Utah  
Sept. 7-10, 1926

Rocky Mountain Division, N.E.L.A.—

and  
Colorado Public Service Association—  
Joint Convention, Glenwood Springs, Colo.,  
Sept. 13-16, 1926

California Electragists—

Annual State-wide Meeting—Hotel Del Monte  
Del Monte, Calif.  
Oct. 1-3, 1926

### Electric Railway Men Guests of Rocky Mountain Committee

The electrical and utility men of Denver and members of the Rocky Mountain Committee on Public Utility Information acted as hosts during the recent third annual convention of the Midwest Electric Railway Association held in that city. Five hundred delegates were in attendance from the

states of Missouri, Kansas, Oklahoma, Arkansas, Nebraska and Colorado.

The principal speaker was Frank R. Coates, president of the American Electric Railway Association and vice-president of the Henry L. Doherty Company.

As part of the entertainment a trip over Lookout Mountain was arranged for the delegates. This included a visit to Buffalo Bill's grave and a banquet at the Motor Club of Colorado in Bear Creek Canyon.

**Meeting of Executive Committee Is Called.**—A meeting of the executive committee of the Northwest Electric Light and Power Association has been called by D. C. Green, president, for Aug. 9. It will be held at the offices of the Pacific Power & Light Company, Portland.

## Book Reviews

### POWER FACTOR WASTES

By Charles R. Underhill, consulting electrical engineer. 326 pages, 118 illustrations, 48 tables, 6 x 9 in., cloth bound. First edition, 1926. McGraw-Hill Book Company, Inc., New York. \$3.50.

Power-factor wastes, so-called, are of vital interest and growing importance not only to electric utilities but also to power users.

This book accomplishes two important functions. First, it is directed at those directly responsible for a large proportion of the power-factor wastes. In this capacity it should serve well to acquaint those persons, as well as others interested, with the costs of power-factor losses and the various causes and cures that have been discovered and studied. Opinions of large operating organizations are included in the text and give it the note of authority. Second, this book serves as a nucleus on the subject, practically all previously published matter having been scattered in the form of articles or papers. It is a composite work of several well-versed persons.

The text deals with the subject in a logical manner, the approach to the general subject being through a discussion of the induction motor. This merges into an analysis of power bills and on into a discussion of the power-factor situation and the fundamental principles involved. Then follow methods and equipment incident to the correction of undesirable power-factor conditions, strategic system locations and other operating data. Statistical data and a general summary of the subject close the text.

### REWINDING SMALL MOTORS

By D. H. Braymer, formerly editorial director, Industrial Engineer, Mem. A.I.E.E.; and A. C. Roe, industrial and insulation engineer, Renewal Parts Engineering Department, Westinghouse Electric & Manufacturing Company. 247 pages, 210 illustrations, 6 x 9 in., cloth bound. First edition, 1925. \$2.50

This is a practical man's handbook on the subject of the winding of small d.c. and a.c. motors. While its con-

struction and treatment of the subject is not that of a text book, it should be of use to trade and other non-technical schools. Technical discussions are avoided in the text except such little as is needed properly to amplify the procedure as presented.

The scope of the text is limited to small machines such as sewing-machine, grinder, fan, and other small motors of fractional horsepower. The authors treat their subject step by step, giving details as met with in the proper order from the start to the finish of the job. The prime object is to give the reader an understanding of the requirements of the windings that are in common use in such small motors at the present day. The book is prepared with the idea of enabling a greater despatch and efficiency in the repair shop handling rewinding jobs of this nature, inspired by the narrow economic margins within which such work must be done.

The book is divided into two parts, one dealing with d.c. motors and the other with a.c. motors. Each part is subdivided conveniently into chapters covering different phases of the rewinding procedure and descriptions of the various types of windings.

### ELECTRIC CABLES

By William A. Del Mar, Chief Engineer, Habirshaw Electric Cable Company; past vice-president, A.I.E.E. A reduction of a series of lectures delivered to senior students in the Moore School of Electrical Engineering of the University of Pennsylvania, 1923-24. First edition. 200 pages, 58 illustrations, 19 reference tables, 9 appendices. McGraw-Hill Book Company, Inc., New York City. \$2.50.

Mathematical arguments and the lengthy derivation of formulas have been avoided even though formulas are used quite extensively in the text. Subjects are dealt with in a simple, informal way that conveys the desired information quite satisfactorily.

A general statement of the cable user's problem and a brief historical sketch covering the development of electrical conductors and particularly cables is followed by information covering the different materials entering into the manufacture of various types of cables. The latest methods of installing and splicing underground cables are covered in detail. Cable-testing methods used in both factory and field testing are explained and the different faults classified. Fundamentals relative to the electrical characteristics of electric cables are touched upon briefly. The electrical characteristics themselves are dealt with more completely.

Important design features also are outlined. Aerial cables, submarine cables and single-conductor cables for triplex circuits each are touched upon and the more important points set forth.

Data pertaining to the present voltage limits in impregnated-paper cables, reasons for the limit and the present trend of manufacture are given. Wires and cables for miscellaneous special purposes are touched upon briefly, giving some of the special conditions which must be satisfied. A brief discussion of electrolysis and comment upon specifications and standards conclude the text matter of the book. The appendices cover various conversion tables and other specific data.

### ALTERNATING CURRENT CIRCUITS

By J. M. Bryant, M.S., E.E., professor of electrical engineering, University of Texas; and J. A. Correll, M.S., associate professor of electrical engineering, University of Texas. First edition, 1925. 412 pages, 289 illustrations, 28 tables, 6 x 9 in., cloth bound, McGraw-Hill Book Company, Inc., New York. \$3.50.

Designed as a text book for junior students in electrical engineering, this book contains the material in use for the past eleven years at the University of Texas. The text obviously is not intended to be a complete treatise on transmission lines, but rather as a general study of circuits of which the transmission line is an interesting practical example.

General theories of a.c. circuits are discussed in the first six chapters. Equations applying to the different types of circuits are developed from the fundamental physical and mathematical principles. A knowledge of mathematics through calculus and first-order linear equations is assumed, but the mathematical discussions are comparatively simple. Considerations are limited largely to non-magnetic circuits. Machines and such are withheld for a future text.

Applications of methods of solution to the various types of a.c. circuits constitute the major portion of the book. This is developed logically, beginning with simple theoretical circuits and progressing through long transmission lines. The final chapter is given over to a consideration of non-sinusoidal wave forms.

Vectors are used liberally throughout the text, and numerous examples are worked out to illustrate the application of the subject matter under discussion. The book should serve as a valuable text within its field.

G.R.H.

## A.I.E.E. News

Saskatchewan Section held its regular summer meeting in an encampment near Estevan, Sask., where camping facilities were established for the purpose. The experiment was adjudged entirely successful and it is hoped to make it an annual affair.

Los Angeles Section.—Officers for the Aug. 1, 1926-Aug. 1, 1927, fiscal year will be as follows: chairman—R. E. Cunningham, Farnham & Cunningham; secretary—L. C. Williams, district manager, Pacific Electric Manufacturing Company; assistant secretary—H. L. Caldwell, Distribution Division, Los Angeles Bureau of Power and Light. The executive committee will consist of Julian Adams, electrical engineer, Pacific Electric Railway Company; P. S. Biegler, professor of electrical engineering, University of Southern California; J. C. Gaylord, planning engineer, Southern California Edison Company, and G. M. Wills, general superintendent, The Southern Sierras Power Company.

## Personals

Paul M. Downing, vice-president in charge of electrical construction and operation, Pacific Gas and Electric Company, San Francisco, was elected second vice-president of the Pacific Coast Electrical Association at its re-



PAUL M. DOWNING

cent convention. Mr. Downing has had an interesting career in the electrical industry. After serving as dynamo tender with the Tacoma Light & Power Company, Tacoma, Wash., and as assistant motor inspector and powerhouse operator for the Market Street Railway Company in San Francisco, Mr. Downing in 1897 became station superintendent of the power house at Blue Lakes City, Calif., for the Blue Lakes Water Company. This was one of the first hydro plants in California and supplied power to the mines at Jackson and Sutter Creek, Amador County. In 1898 Mr. Downing became associated with John Martin as agent for the Stanley Electrical Manufacturing Company in the installation and operation of electrical apparatus in connection with long-distance, high-voltage transmission systems. In 1900 he was made chief electrician for the Standard Consolidated Mining Company at Bodie, Calif., and subsequently became manager of the Colusa Gas & Electric Company, Colusa, Calif., later absorbed by the Pacific Gas and Electric Company. The following year, after a short service as line foreman, he became division superintendent of the Bay Counties Power Company at San Francisco in charge of the transmission and distribution of power. The transmission voltage from the power house was 45,000, then the maximum voltage in the world. In 1903 Mr. Downing took the position of superintendent of substations for the California Gas & Electric Corporation and operating engineer for that company and for the Pacific Gas and Electric Company which later took it over. Subsequently he became division superintendent and operating engineer for the latter company, and in 1908 engineer of operating and maintenance. Nine years later he was appointed chief engineer of the electrical department. In January, 1920, he was made a vice-president of the company in

charge of electrical operation, and shortly thereafter was given the title that he now holds.

Albert Meinema, for sixteen or seventeen years associated with the Electric Appliance Company, San Francisco, in various capacities, has severed his connection with that company. After an extensive Eastern trip Mr. Meinema plans to engage in business for himself.

C. F. Kettering, vice-president of the General Motors Corporation, his son and four associates, C. S. Mott, vice-president of that company; W. A. Christ, chief engineer of the Delco Light Company; Julius Stone, and Adam Schantz, touring the United States by special motor bus, arrived on the Coast recently. Mr. Kettering is in charge of the research department of the General Motors Corporation and is said to be the inventor of the electric starting and lighting system now in use on several makes of cars as well as of the Frigidaire cooling devices. The bus in which the party is traveling is equipped with electric lights and a Frigidaire, radio and other electrical conveniences.

R. E. Cunningham, of Farnham & Cunningham, Los Angeles, has been elected chairman of the Los Angeles Section, A.I.E.E., for the ensuing year.

R. R. Cowles, assistant engineer, department of electrical distribution, Pacific Gas and Electric Company, San Francisco, has been appointed member at large of the Engineering National Section, N.E.L.A. Mr. Cowles is retiring chairman of the Technical Section, P.C.E.A.

Al C. Joy, Sydney W. Green and Miss Frances Pratt of the publicity department, San Joaquin Light & Power Corporation, Fresno, Calif., visited San Francisco early in July to attend the convention of the Pacific Coast Advertising Clubs Association. Mr. Joy was one of the speakers at the public utilities departmental.

P. P. Pine, power sales engineer, San Diego Consolidated Gas & Electric Company, attended the July meeting of the water heating committee, Pacific Coast Electrical Association.

J. O. Dillingham, merchandising department, General Electric Company of Los Angeles, was in San Diego for a number of days recently.

Lieut.-Col. G. H. Whyte of the Calgary branch of the Dominion Water Power and Reclamation Service has been appointed assistant district chief engineer of the British Columbia and Yukon branch of the service, with headquarters in Vancouver, B. C.

Guy W. Talbot, president, Pacific Power & Light Company, and Northwestern Electric Company, Portland, has been named a member at large on the Public Relations National Section and a member of the water power development committee of the N.E.L.A. for the year 1926-7.

Paul Bailey, deputy state engineer of California since 1921, has been appointed state engineer succeeding W. F. McClure, deceased. By this appointment Mr. Bailey also becomes ex-officio chief of the division of engineering and irrigation and director of the department of public works.

P. H. Booth, of the Edison Electric Appliance Company, has returned from a business trip to Chicago. While in the East Mr. Booth attended a sales conference of that organization.

Gen. George H. Harries, vice-president, H. M. Byllesby & Company, recently arrived in San Diego from Chicago.

W. S. Van Winkle, president and general manager, Bay Point Light & Power Company, Bay Point, Calif., recently was elected president of the Contra Costa Electrical Development League.

P. H. Booth, of the Edison Electric Appliance Company, Los Angeles, made a special trip to Seattle to attend the recent wedding of Ray W. Turnbull, Pacific Coast manager of that company, and Miss L. Carrol Dangler.

J. B. Ledlie, superintendent, Mesilla Valley Electric Company, Las Cruces, N. M., has been re-elected secretary of the Rotary Club of that city.

John B. Miller, president, Southern California Edison Company, Los Angeles, has been named a member of the electrical resources of the nation committee, the constitution and by-laws committee, and the Electrical Manufacturers' Council of the N.E.L.A. for the year 1926-7.

A. W. Copley, manager engineering division, San Francisco district office of Westinghouse Electric & Manufacturing Company, has gone to the company's East Pittsburgh works where he expects to spend about two months studying the latest power equipment.

J. G. Rollow, electrical engineer for the Los Angeles Gas and Electric Corporation, has been made chairman of the Technical Section of the Pacific Coast Electrical Association for the coming year. Mr. Rollow was graduated from the University of Tennessee in 1905. Following his graduation he entered the employ of the Stirling Company, of Barberton, Ohio, which was purchased by Babcock & Wilcox Company in January, 1907. After spending one year with the International Steam Pump Company, he re-



J. G. ROLLOW

turned to the Babcock & Wilcox Company. In 1913 Mr. Rollow went to work for the Southern California Edison Company in Los Angeles, leaving that company in 1917 to enter the engineering department of the E. I. du Pont Nemours Company. From 1920 to 1924 he was consulting engineer for the Los Angeles Gas and Electric Corporation and in February of the latter year he was placed in charge of its electrical operation and construction with the title of electrical engineer. Mr. Rollow is a member of the A.S.M.E. and an associate member of the A.I.E.E.



Ross L. Mahon, who has been associated with the Pelton Water Wheel Company as sales engineer since July, 1913, has been appointed to the position of assistant sales manager. Mr. Mahon is a graduate of the University of California, class of '10, and later attended the University of Michigan for one year where he received the degree of B.S.E. in 1912. Upon completion of his studies he became associated with the Charles Butters Company, serving in an engineering capacity for one year. During the World War Mr.



ROSS L. MAHON

Mahon held the rank of captain in the 316th Engineer Regiment, 91st Division, participating in three major offensives in France and Belgium. He now holds the rank of reserve major in the same organization. Since being associated with the Pelton organization Mr. Mahon has taken an active part in the technical work of the Pacific Coast Electrical Association, of which he is a member. Likewise he has been active as a member of the American Society of Mechanical Engineers, Society of Military Engineers and the San Francisco Engineers Club.

Prudence Penny (Mrs. B. R. Charles), nationally known lecturer and journalist, whose articles on home economics appear extensively in the daily press, addressed the Electric Club of San Diego at a recent meeting on the subject "What I Know About Your Wives." Being one of the pioneers in the abolition of kitchen drudgery, she is of course an ardent advocate of the wider use of electrical service in the home.

Carl Sachs, of the Arrow Electric Company, Los Angeles, returned recently from a trip East where he attended a national sales meeting of the Arrow organization at Hartford, Conn.

J. U. Berry, advertising manager, Valley Electrical Supply Company, attended the convention of the Pacific Coast Advertising Clubs Association held in San Francisco in July.

Roy Worth, assistant district manager of the Pacific States Electric Company, San Francisco, has resigned his position with that company effective Aug. 1. He has been connected with the electrical supply jobbing business on the Pacific Coast for the past eighteen years. Most of that time was spent in the Northwest where he was district manager for the Pacific States company before his transfer to San Francisco three years ago. Mr. Worth is leaving San Francisco to look after personal business interests in the southern part of the state.

A. W. Leonard, president, Puget Sound Power & Light Company, Seattle; D. L. Huntington, president, The Washington Water Power Company, Spokane; D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake City; John D. McKee, president, The California Oregon Power Company, San Francisco, and A. G. Wishon, president, San Joaquin Light & Power Corporation, were among the Western men named as members of the Water Power Development Committee, N.E.L.A., for the year 1926-7. W. E. Creed, president, Pacific Gas and Electric Company, San Francisco, was appointed chairman of the committee.

William Dee has been appointed district superintendent of the Dominion Government telegraphs for the Ashcroft district of British Columbia, as successor to C. E. Goodling, and has taken up his duties with headquarters at Ashcroft.

W. A. J. Guscott, vice-chairman of the advisory board, Electrical League of Colorado, Denver, recently returned to that city after an interesting trip to Philadelphia.

H. B. Woodill, president, Safety Electric Products Company, Inc., Los Angeles, visited San Francisco a short while ago.

Ray W. Turnbull, Pacific Coast manager, Edison Electric Appliance Company, San Francisco, was given a luncheon by the electrical men of Portland on the occasion of his passing through that city with Mrs. Turnbull following his recent marriage in Seattle. About thirty representatives of the power companies, the jobbers, the manufacturers and the press were present.

W. C. Drummond, operating mechanical engineer, Byllesby Engineering and Management Corporation, visited the properties of the San Diego Consolidated Gas & Electric Company not long ago. Mr. Drummond expected to include in his itinerary all Byllesby properties on the Pacific Coast.

Fred Phillips, of the North Coast Electric Company's sales force, left Seattle a short while ago to attend the convention of the National Lamp Works of the General Electric Company at Nela Park, Cleveland.

R. H. Ballard, executive vice-president and general manager, Southern California Edison Company, Los Angeles, has been named as a member of the water power development committee, the electrical resources of the nation committee, and the Charles A. Coffin prize committee of the N.E.L.A. for the year 1926-7.

Maj. C. R. Olberg, assistant chief engineer, irrigation bureau, Indian Service, U. S. Department of the Interior, recently visited the Skagit River hydroelectric project under development by the city of Seattle, as a guest of the city council.

J. L. Stannard of Portland, Ore., has been retained by the city of Aberdeen as consulting engineer for both the power and water projects proposed on the Wynooche River. Mr. Stannard recently completed supervision of the Cushman Power development for the city of Tacoma.

R. W. Murphy, district manager, Westinghouse Lamp Company, San Francisco, returned not long ago from a business trip in the Pacific Northwest that lasted about a month.

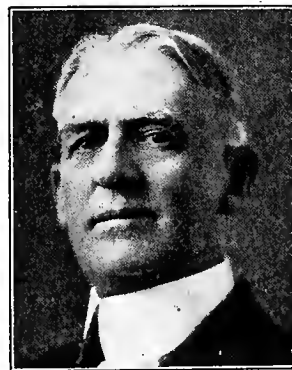
Charles Heston Peirson, assistant vice-president, Southern California Edison Company, Los Angeles, attended the recent convention of the National Editorial Association in San Francisco.

David Hall, for seventeen years in the engineering department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, has been made manager of the newly formed engineering division of the company's Los Angeles district office. He has been engaged in the design and application of d.c. power machinery and equipment, steel mill equipment and similar equipment for the past twenty-five years.

H. L. Garbutt, manager merchandising division, Westinghouse Electric & Manufacturing Company, San Francisco, lately returned from a trip to the company's Mansfield and East Pittsburgh works.

## Obituary

Charles A. Luckenbach, third vice-president and treasurer of the Los Angeles Gas and Electric Corporation, passed away July 9, at the age of 61, after a month's illness. Mr. Luckenbach was born in Bethlehem, Pa., March 24, 1865. He was graduated from Lehigh University in 1886, immediately entering the employ of the Crane Iron Company at Catasauqua, Pa. Three years later he went to Los Angeles. From 1890 to 1897 he was employed by the city of Los Angeles, first as deputy city clerk, later as city clerk. In August of the latter year he entered the employ of the Los Angeles Gas and Electric Corporation as purchasing



CHARLES A. LUCKENBACH

agent. In 1905 he was made manager of construction. He was elected third vice-president and a member of the board of directors in 1917, and the additional duties of treasurer were given to him in 1924. Mr. Luckenbach was very active in the affairs of the corporation, and his unexpected death came as a decided blow to the industry.

Harry H. Knox, president of the Alaska Electric Consolidated Company, Nome, Alaska, died in that city recently from an electric shock. Mr. Knox was an Alaskan pioneer and for many years followed electrical engineering in that country.

## TRADE NOTES

**Coffin Valve Company**, Neponset, Mass., has issued an 83-page catalog on standard sluice gates, giving descriptive and dimensional information, recommendations and sample specifications. The book is lavishly illustrated.

**Paul W. Koch & Company**, Chicago, have placed on the market a new two-bladed saw, known as the "Jiffy" Joist Notcher. This is for cutting slots in wood joists for  $\frac{1}{2}$ -in. and  $\frac{3}{4}$ -in. conduit. A depth gage prevents making excessive cuts, and as both cuts are made in one operation considerable time is saved.

**The Cook Porcelain Insulator Corporation**, Cambridge, Ohio, manufacturer of porcelain insulators and power-line hardware, has established a New York office at 161 Grand Street. J. H. Parker has been appointed eastern sales representative with headquarters in New York.

**Westinghouse Electric & Manufacturing Company**, East Pittsburgh, is manufacturing a new device known as the sentinel breaker, which will protect the motor and mechanism of washing machines, ironers and other electric appliances from damaging overloads. The breaker is reliable in operation and rugged in construction. In addition to protecting the motor, it also prevents blowing the house fuse.

**Bakelite Corporation**, New York City, has issued a large folder illustrating the uses of Bakelite. The opportunities it affords are presented more completely in another booklet, entitled "Bakelite Molded," a copy of which will be mailed upon request.

**Taylor Brothers Churn & Manufacturing Company**, St. Louis, has issued a folder containing complete information on its line of electric ice cream freezers. The folder is illustrated and contains a detailed price list. Descriptive and illustrative literature covering its line of electric churns is also available.

**Utica Products, Inc.**, Utica, N. Y., has announced that it has perfected its product, the Utica electric portable furnace, to a point where the company claims for it a more even temperature and greater heat than is possible with any other electric heater using a 660-watt element.

**Chicago Fire Brick Company**, Chicago, has issued bulletin 1, series C, describing and illustrating its products, including flat suspended arches, wall tie blocks, boiler door arches, brisket, thermopaste, electric furnace fire brick and Wellsville Savage fire brick. The advantages claimed for its products for electric furnaces are covered thoroughly.

**Crouse-Hinds Company**, Syracuse, N. Y., has issued bulletin No. 2089 on condulets for grounding, service wire and conduit system. Price lists and photographs are given.

**General Electric Company**, Schenectady, has issued a small pocket-size folder illustrating and describing its line of electric fans. Catalog numbers and price lists are shown.

**The Burndy Engineering Company**, New York City, manufacturers of high-tension bus equipment, has appointed the **H. M. Thomas Company**, San Francisco, as its California representative. Plans are being considered to warehouse the standard Burndy line of connectors for copper tubing and cable in San Francisco, thus establishing a quick shipping point for the West Coast.

**The Chemical & Vacuum Machinery Company, Inc.**, Buffalo, N. Y., has acquired from the **Judelson Evapo-Dryer Corporation**, New York City, all rights to build and market exclusively the apparatus known as the **Judelson Evapo-Dryer**.

**Atlantic Electric Goods Company**, New York City, has issued a circular entitled "Erixelets," a name applied to fittings used in connection with a new system of electrical circuit distribution invented by F. W. Erickson. The folder is illustrated with photographs and contains complete descriptions as well as price list. The company is contemplating bringing out a new line of fuses, plugs and receptacles in the near future.



Out in the great open spaces of Concord, Calif., where gophers are gophers, and no foolin', C. C. Caven, of the Graybar Electric Company (center), is going to try a little electrocution. Harry Barnard, Curtis Lighting Company, expert on X-Rays; thinks that Caven should try floodlighting, naturally, but Art Fryklund, also Graybar, pipe in mouth, reserves his opinion of trick electric gopher traps. Caven says, however, that the pearls will be good next year if his patent electric traps do their stuff. Who said "rural electrocution" anyway?

**The Timken Roller Bearing Company**, Canton, Ohio, has changed its Los Angeles address to 1361 South Figueroa Street. It formerly was situated at 1241 South Hope Street.

**The Foos Gas Engine Company**, Springfield, Ohio, has issued a new circular on its type "L" diesel engine, a new unit, which it is claimed presents a decided advance in diesel engine design and construction.

**Luddlum Steel Company**, Watervliet, N. Y., producers of carbon and alloy tool steel, is changing over its mill from 40 to 60-cycle electrical equipment. This change is expected to bring about a greatly increased flexibility and output of the mill as a whole.

The **Cutler-Hammer Manufacturing Company**, Milwaukee, has issued a new publication entitled "Industry's Electrical Progress." The advantages of electric power to industry are pointed out and the progress made in electrical equipment, particularly in motors and motor-control apparatus, is described. Many photographs of installations are shown. Free copies of the book will be sent on request.

**Roach-Appleton Manufacturing Company**, Chicago, has started manufacturing lock-seam type 1-in. tin speaking tube, square elbows and tees for 1-in. speaking tubes.

**The Anderson-Pitt Corporation**, Kansas City, Mo., has developed a new instantaneous electric heater, which it is claimed embodies an entirely new principle in heater construction. The heater is a scientific reflector which controls all the heat rays. All the heating element faces the reflector at the correct position to get complete reflection of the heat rays. No current is wasted; all the electrical energy is converted into heat and evenly dispersed, according to the company.

**Allen-Bradley Company**, Milwaukee, has issued bulletin No. 600, which contains an interesting discussion on the merits of various types of starters for squirrel-cage motors with special emphasis on the characteristics of the compression-resistor type of primary resistance.

**The Safety Electric Products Co., Inc.**, Los Angeles, has opened an office at 253 Golden Gate Avenue, San Francisco, with G. G. Thompson, vice-president, in charge. The concern recently issued a 1926 catalog which describes and lists all stock articles. In addition, it sets forth much engineering data which should assist electrical engineers in selecting the type of distribution switchboards and panelboards to suit the installation. Catalogs with price list may be obtained from either of the offices upon request.

**The Edwin F. Guth Company**, St. Louis, has developed a new fixture known as the Guthlite, which it is claimed controls and directs light, gives uniform intensity on the working plane, shadowless ceiling illumination and wide light distribution. It has an adjustable reflector and self-adjusting spring globe holder. L. A. Hobbs is the Western representative of the company with headquarters in San Francisco.

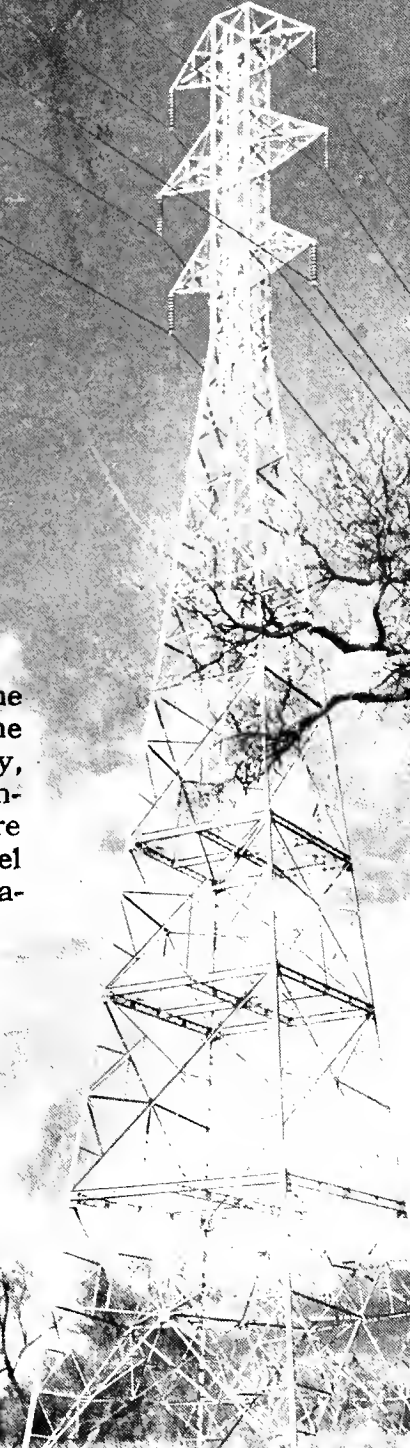
**Ren Manufacturing Company**, Winchester, Mass., has produced a simple and effective lock to prevent the theft of electric light bulbs. The Ren-Lock consists of only two parts, a coiled spring and a grooved ring. A special punch is used to attach the lock to the socket. It can be used with standard electric light bulbs and standard brass, porcelain and weather-proof sockets.

**Landers, Frary & Clark**, New Britain, Conn., has announced through its San Francisco sales office that its range division now has on the market an all-white porcelain line of ranges. The oven is also an entirely new feature as it now is lined with Resistin, a stainless and rostoproof lining.

**Roller-Smith Company**, New York City, has added a supplement to bulletin No. 530 covering direct-acting time-limit attachments for standard-type circuit breakers. Illustrations and price lists are included in the circular.

# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES



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# Journal of Electricity

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IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication  
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TO answer the question as to whether readers of McGraw-Hill publications depend upon these papers for information regarding new developments in their respective industries and use the advertising pages as a buying guide, thousands of subscribers were interviewed by field men. The card index that shows the results of this investigation tells a remarkable story. Over 90 per cent were close readers of the advertising pages, and the information presented therein had a decided influence upon their buying.

Such reader interest is one of the reasons for the eminent success of these technical publications. It is a factor which cannot be overlooked by a manufacturer planning intensive advertising coverage of a particular field.

As explained in the advertisement of the McGraw-Hill Publishing Company, Inc., on pages 46 and 47 of this issue, the use of media such as these is one of the McGraw-Hill Four Principles of Industrial Marketing. These principles are:

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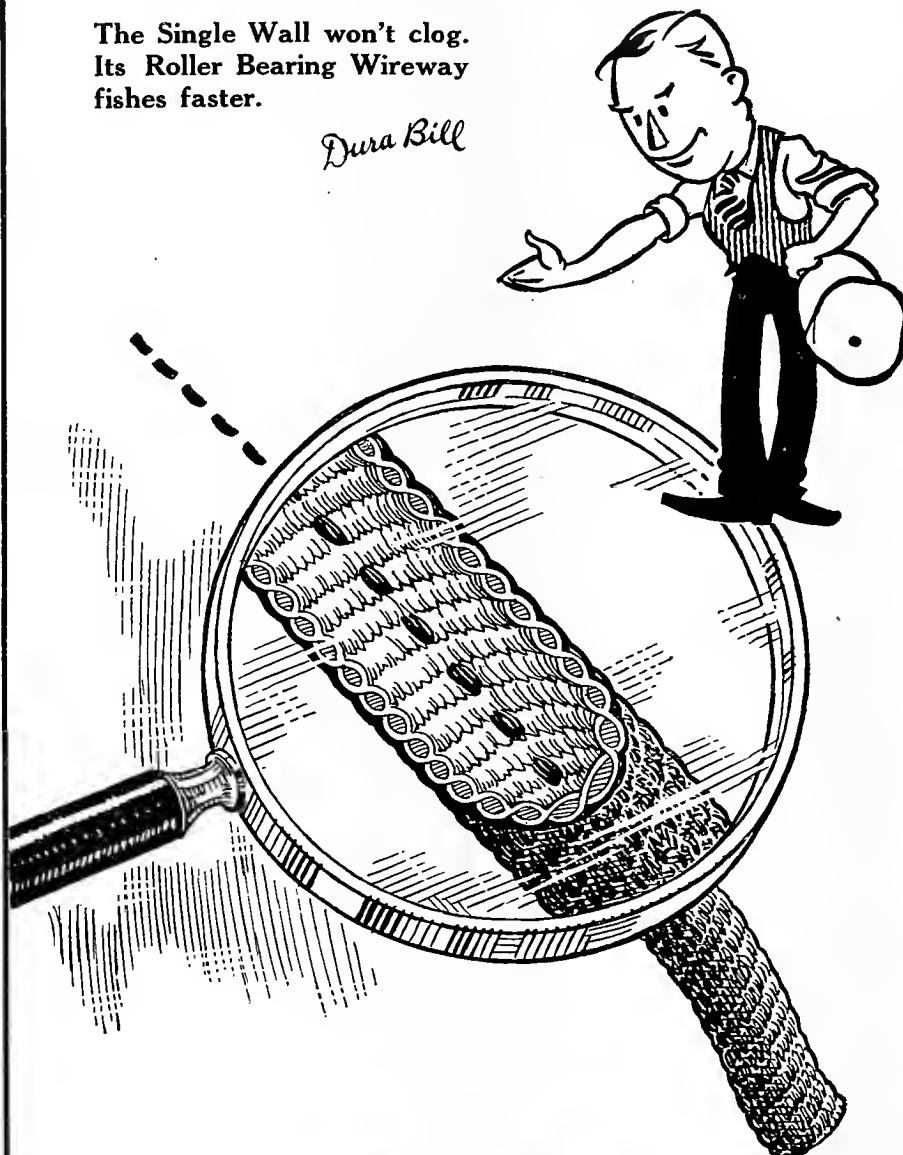
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# EDITORIAL

## Water and Power Act Has No Bearing on Colorado River

STATEMENTS to the effect that the proposed California Water and Power Act would insure the construction of the Boulder Canyon project will have little bearing with the voters of southern California at the coming November election. The action of the president of the Boulder Dam Association in denouncing the Water and Power Act has laid to rest the fictitious claims of the proponents of this measure. Because the Colorado River question is first and foremost in the minds of many residents of southern California, the sponsors of the act permitted the impression to become general that a vote for this amendment to the constitution was a vote for early development of the Colorado River. This false impression made the securing of the signatures necessary to put the measure on the ballot comparatively easy. It had been hoped, so it is said, that the same false impression would bring many votes. The action of the Boulder Dam Association in enlightening the voting public is commendable. The proponents of the water and power act will have to seek a new brand of political red fire if they hope to save the measure from an even worse defeat than it has met at the last two elections.

## By What Yardstick Is Service Measured?

POLICE departments have been criticized, and justly so, when they have based the measurement of their efficiency upon the number of arrests made rather than upon the actual peace of the community. In a like manner there has been a tendency at times in public-utility relationships with the public to gage the quality of service rendered upon the basis of complaints received. If there were many complaints, the service was bad. If there were no complaints, it must follow that the service was excellent.

Yet by no such simple yardstick as this is service to be measured. It would be decidedly easier to render good service if this were all that was required. A list of complaints is a tangible thing. It can be dealt with. Unfortunately, however, it is not upon such visible measurement that the public utility should depend to ascertain the quality of its service.

What criterion is there, then, by which satisfactory service may be judged, or must it always be a matter of probability, of guesswork? It may safely be said that service from which many complaints are received is undoubtedly poor. And in the absence of complaints it is equally safe to assume

that the service rendered is at least fair, or to be more conservative, is tolerable.

By these calibrations of the scale of service one may go on to assume really good service to be something just beyond either of the foregoing, something more than mere lack of complaints—which may be lacking only from sheer disgust and a feeling of futility resulting from experience with previous complaints for which nothing satisfactory has been done. If bad service is indicated by vocal expression, and tolerable or adequately fair service is expressed by silence, then it is reasonable to assume that good service, excellent service, is that which, on the other swing of the pendulum, brings forth vocal expression also, but expression of a positive rather than a negative nature.

Really good service is that service, therefore, which is being sung upon every tongue in the community in which it thrives. It is service which is its own best advertisement, for everyone receiving it voices his appreciation of it. Just as poor service brings protest as a natural consequence, so good service evokes commendation spontaneously.

How shall that type of service be achieved? That is another story, one which will bear more searching inquiry. But in this instance it is not well to determine the standard by which good service shall be gaged, so that in future efforts to attain it some definite idea of just how successful those efforts prove may be ascertainable?

## Localizing the Power Company in Individual Towns

CONSOLIDATIONS and concentrations make for efficiency it is true, but how often at the price of personal interest. From an engineering standpoint it is sound policy to generate power at a few central stations and to distribute to far sections over an expanding network. Following the engineering plan, business organizations handling such power distribution have been prone similarly to concentrate responsibility in business central stations, with mere routine detail handled in the field through persons corresponding to the secondary distribution circuits.

Theoretically, and as far as it goes, that plan is good. Yet it fails to take into proper engineering consideration one variable factor, namely, human nature. Human nature is individualistic. Human beings have pride, loyalty, and individuality, all commendable qualities and necessary. They dislike and are suspicious of mass activity, especially if it is in some other town than that in which they live.

It is politic, even if it is less theoretically efficient,

therefore, that as little centralization, as affects personal contacts, be effected as possible. The home town likes to feel that it is important. It likes to be considered necessary to the organization. It likes to have a "say" now and then. It wants some of the trade of the organizations which serve it.

As a result, that which may seem to be wasteful nonsense from a general theoretical standpoint—the purchasing of some of its supplies from the small town dealers, for instance—may prove in the end to be the best engineering after all. At least it will be engineering which takes into account one important factor, the factor upon which much of the future of any enterprise must rest—human nature.

### A New Problem in Servicing Electric Ranges

"SHALL the power company service ranges sold by department and furniture stores?", asks the manager of the commercial department of one of the large Western central stations. The question was asked following the visit of the manager of a large department store during which the announcement was made that the store had taken over the distribution of a certain range and assumed that the power company would service all ranges sold on the same basis as it serviced ranges sold by its commercial-department salesmen. In this particular instance the brand of range in question was one which did not have the best record desirable insofar as servicing was concerned.

It would seem that servicing in this case is a job for the central station since it is to its interest to see that the range is kept in operation. However, such a policy has several drawbacks. In the first place, if the power company assumes the servicing, then the department-store salesman can make unlimited statements for the range, answering all of the prospective purchaser's inquiries with the statement, "The power company will take care of that." If the range should prove to be of inferior quality, then the power company may be in the path of a storm for any customer hates the fellow who tells him that he has been a sucker. This, however, is a responsibility which the power company must face. The solution to the problem would seem to involve a close understanding between the company and those on the outside who also are merchandising ranges.

### More Bonds Mean More Taxes

IN spite of marked economy in federal government, the cost of local government continues to mount at an alarming rate. This is borne out by recent figures which show that the total bonded indebtedness of all forms of government in California now has reached the astounding figure of \$609,549,227 as of June 30, 1926. This is an increase over the last fiscal year of \$76,349,976 and represents an increase of 549 per cent over the total bonds issued prior to 1911. According to California's state con-

troller, the present bonded debt represents 10.5 per cent of the total assessed value of non-operative property in the state. Since 1911 the assessed value of non-operative property has increased only 160 per cent. The per capita bonded indebtedness increased from 1912 to 1926 290 per cent. Cities are shown to have had the smallest percentage increase since 1911, namely, 331 per cent. During the same period the bonded debt of counties increased 905 per cent and of the state 1,650 per cent. Bonded indebtedness is increasing at an accelerated rate, for during the past four years the average has been approximately \$46,000,000 per year.

Primarily this does not affect the electric light and power companies of the state directly since public utilities are subject to a state tax of 7½ per cent of their gross earnings and in some cases a county or city franchise tax of 2 per cent of their gross. This can be changed only by legislative action. However, should bonded debt increase to a point where the tax burden becomes too great for the public it is conceivable that this method of taxation might be changed. Of more direct importance is the fact that this debt is being carried to a great extent by private industry. Since the success of the utilities themselves and the state as a whole is dependent in a large measure upon the success of industry, increases in tax rates or assessed valuation cannot be brooked. Any further increase in bonded indebtedness cannot help but affect industry adversely.

Nor is California the only state which is pawning its future. The same condition holds for practically every one of the Western states. The issuance of tax-free bonds is a prevalent disease. A distinct reversal of public policy is needed if private industry is not to be curtailed and the future of the state impaired.

### An Ounce of Prevention

WITH all due respect to General Goethals, the Panama Canal never would have been built had it not been for the success of Colonel Gorgas in stamping out the sources from which the yellow fever mosquito sprang. In fact, disease prevention has made more progress by far than disease cure. Attack a problem at its source if you want to solve it, whether you are trying to rid a tropical locality of yellow fever, or trying to bring about higher standards of adequacy in house-wiring.

What is the source from which house-wiring standards emanate? Obviously, it is the architect and builder. Of all the homes that are erected only a small percentage are built from plans drawn by architects. The architect figures in the larger, more elaborate homes, ranging in price from \$15,000 and upward. There are probably 50 to 100 homes in the price class of \$10,000 and less to every one above that figure. Enter the realtor who opens tracts and builds large groups of comparatively moderately priced homes for re-sale almost entirely



on the installment plan. The purchaser of a ready-made home knows little and cares less about how his house is wired. Taken for granted that he will have electric lights, he is concerned only with what he can actually see—the hardwood floors, the attractive mantel, the two-car garage, the breakfast nook and the white tiled bathroom. Then he signs on the dotted line and does not realize until some time afterward that, inspired with the electric cooking and heating idea, he must assume a cost of \$75 or more for changes in his house-wiring in order to make possible the use of these desirable and convenient electric servants.

A consumer demand must be created for adequate house-wiring. Only in this way can the builder and realtor be induced to bring their wiring specifications up to proper standards of adequacy from the low standards based almost solely upon first cost. The buyer will get what he wants. Now, he doesn't want it hard enough to ask for it, simply because he doesn't know about it. He must be educated, not spasmodically but continuously, even though it may take years to get the message across. It will pay the industry handsomely in the end.

---

#### **Cooking and Heating as Load-Builders**

**N**O industrial executive today seriously doubts the advantages of electrification. That idea has taken root and from now on will grow of its own intrinsic usefulness. Development of motor load, therefore, is not the problem that it once was.

Still it is from domestic consumers that the bulk of revenue comes, and it is from this group that great increases in load must be built. Industry has become electrified almost of its own momentum. The home is becoming electrified more slowly. Of domestic load-builders, the range, water and air heater are the appliances of major import as yet.

Few executives will grant that all of the problems incident to the sale of these appliances have been solved. There are even those who will not admit that this load is desirable.

Just how important this cooking and heating load on domestic lines may become in ironing out demand irregularities has been summed up admirably by E. F. Perkins in the paper found elsewhere in these pages. This comprehensive study of range characteristics and its constructive selling ideas make it a contribution of considerable worth to an industry whose great problem is that of load-building.

---

#### **Sales Managers and the "Great Open Spaces"**

**M**OVIE addicts throughout the United States are accustomed to the characterization of the West as "The Great Open Spaces." This interesting little bit of descriptive matter does not seem to have percolated through the cranium of the average sales manager to any marked extent, however. It is not at all unusual, unfortunately, for an Eastern sales manager to appoint a Pacific Coast district

representative with headquarters in San Francisco and expect him to cover a territory representing 40 per cent of the area of the United States all by himself, obviously a physical impossibility to anybody familiar with Western conditions and Western distances.

Under the best of circumstances, if the district representative should be a superman and be able to bring about jobber-dealer distribution, he will spend most of his days and nights on Pullman cars trying to maintain contact with his customers and keep adjusted the innumerable difficulties and disputes that arise constantly between factory and distributor. If, on the other hand, he is attempting to sell direct, he is obliged to confine his activities to one locality only, which he can watch, cultivate and bring into fruition, rather than attempt to spread himself out over 40 per cent of the area of the United States, run himself to death in the effort, and accomplish practically nothing thereby.

Sales managers in the East do not realize the extent of the Western country, the diversity of its resources, the great distance between population and distribution centers, or they would not set for a lone factory representative such impossible tasks. Rather they should visit the West and spend enough time here to study carefully the conditions entering into local business conditions. Those who do or have done this are reaping the harvest. Those who do not can gather no more than the crumbs that fall from the table of Western electrical development.


---

#### **Reducing the Cost of Conventions**

**C**ONTRARY to the seemingly popular belief that the conventions of technical organizations must be held in the splendor and formality of the best hotels of the larger cities to insure success, the reverse has been proved. The Saskatchewan Section, A.I.E.E., held its regular summer convention in the simple setting of an outdoor camp and found the experiment eminently successful. Tents, bedding, electric lights, water and sanitation were provided at the nominal total cost of but two dollars per adult; no charge was made for children.

Advantages derived from this camp meeting were: low cost, the ease of obtaining full attendance at convention sessions, development of an atmosphere of goodfellowship, attendance of men with families, and a strong appeal to the individual delegate to whom normal convention expenses are not attractive. The efficacy of this latter point was proved by the attendance of men who drove from 200 to 400 miles to attend.

Instead of arranging conventions at the most expensive hostelrys and with all the pomp, flourish and formality historically ascribed to ancient courts, it might be a wholesome idea to accept a hint from the above and revert to simpler environment. If, in so doing, convention activities were made available to the so-called lesser lights of the industry, far greater good undoubtedly would result and at a negligible sacrifice, if any.



A TYPICAL stretch of country encountered in the first 19 miles of the Southern California Edison Company's third 220-kv. Big Creek line. Here 38 miles of roadway had to be constructed at a cost of \$12,000 per mile to permit construction and maintenance on 19 miles of the line.

# Value of the Cooking and Heating Load to the Electric Service Company

By E. F. Perkins\*

Pacific Gas and Electric Company, San Francisco

**T**HERE are two questions which have been prominently confronting the electric public utilities. These questions are: (1) What is the value of the cooking and heating load to the electric service company? (2) What is the position that should be taken by the electric service company in the merchandising of these appliances?

J. E. Davidson, president of the National Electric Light Association during the year which has just been completed, recently made a statement in reply to the following question, "Why is it that only 50 per cent of the light and power companies merchandise electrical appliances?" A part of his reply was, "It is my personal opinion that companies which do not use every means and method in doing this are not fulfilling their franchise obligations."

A new era has come, and the utilities no longer can look to new extensions to supply a good part of the future growth. They must now face the problem of exerting greater energy towards the increasing of loads and consumption on existing facilities. In order to load existing facilities, electric energy-consuming devices must be sold. During the past five years a great many utilities have been building up this appliance load and the next five years of merchandising activity will be determined in a large measure by the success and experience of the past five years.

If these engineers who made our territory stand out in the electrical world are to continue their aggressive activities, then we must have sales executives of the same indomitable spirit, courage, energy and vision, who will develop an outlet for this energy.

By the same kind of methods that our engineers employ, sales managers should determine by an analysis of lines, load curves, operating charts, diversity and demand, which appliances will tie in to the best advantage with the system and then overcome all obstacles to see that these are

***LOAD-BUILDING upon existing lines has been recognized as the big task confronting public service companies, now that the largest of their engineering problems have been met. To iron out the load curve and build up business on residential lines where the greatest opportunity lies, the range, water heater and air heater are advocated in this thoroughly comprehensive paper. A searching analysis and constructive suggestions are contained in this survey of the situation.***

placed on the lines of their companies.

What do we mean when we say electric service company merchandising? Do we mean that an electric service company must sell every known electrical device in order to be considered as merchandising? A strict analysis of the word would lead us to believe that any firm in business which buys and sells any manufactured product to the public is merchandising. Then any electric service company which decides that it desires to build up its load of any specific appliances by direct sales is

merchandising. It is good business on the part of the electric service company to analyze the field of appliances and concentrate its efforts on those particular appliances which build a desirable load and on which there is little or no effort being placed by other merchandisers.

Assuming then that a large part of the future growth on the part of the electric service company must come from the loading of existing facilities, we have only to refer to reliable statistics and we shall find that 80 per cent of all electric consumers are domestic consumers. Let us then analyze the load of these 80 per cent of our consumers.

Figure 1 represents, as perhaps you recognize, an electric meter. This meter is installed in a home where electricity is used for lighting only. The average revenue from lighting is approximately \$26 a year. An electric range is installed in the home. The average revenue has increased \$54.60, and the total revenue has increased over 200 per cent. An electric water heater next is installed. The annual revenue increases \$53.16. The total revenue has increased more than 400 per cent. A 3-kw. electric air heater is installed next. The annual revenue increases \$36. In all the revenue has increased 553 per cent in this home.

This pictures the vast opportunities which exist on the present lines awaiting development.

The electric light and power companies should be in business to sell electric energy-consuming devices and supply the kilowatt-hours. The important factor to be investigated then appears to be a study

\* Report of the electric cooking and heating committee of the Commercial Section, Pacific Coast Electrical Association, presented at the annual convention June 9, at Los Angeles, Calif.

of this load from a distribution and operation standpoint. The following charts show an analysis of typical loads:

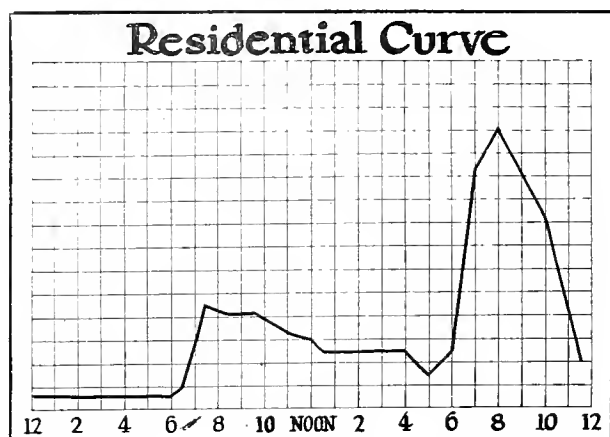


CHART 1.

Shows the load as recorded on a primary distribution circuit, which is made up principally of residential load, with scattered commercial houses and small motors. This curve shows that this line is practically idle except for a period of about three hours during the evening of each day. There is certainly an excellent opportunity for loading existing facilities and filling the valley on this line.

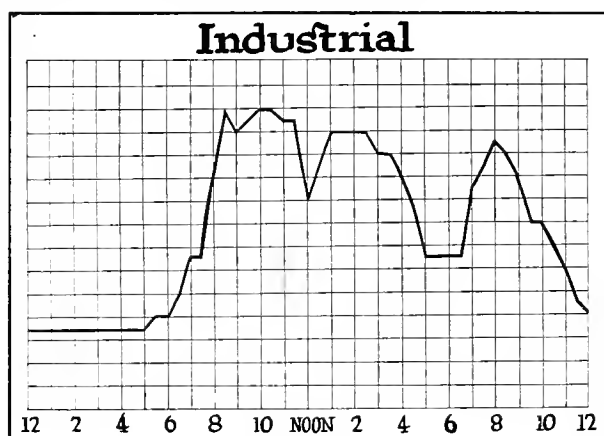


CHART 2.

Showing the load on a circuit in an industrial district to observe what would be the result in the over-all of an increased heating and cooking load in the residential section. This curve shows that there are two peaks, one from 8:15 a.m. to 11:15 a.m., the second from 1 p.m. to 4 p.m.

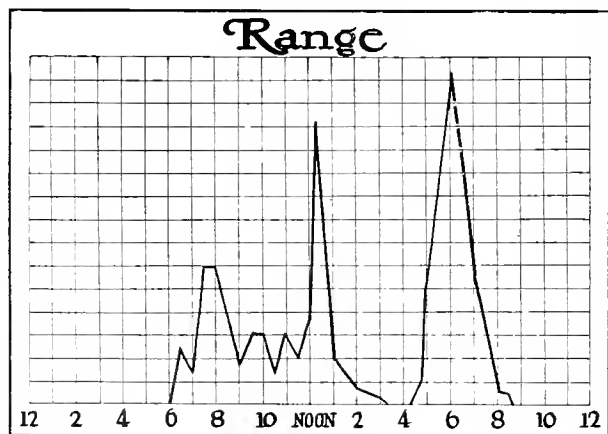


CHART 3.

This chart was obtained from a report of the electric range survey committee of the N.E.L.A., as conducted by the Northwest section. It shows that the electric range morning load decreases as the industrial load comes on, also that the noon cooking load increases and decreases, respectively, as the industrial load goes off and comes on and

that the evening load decreases as the lighting peak comes on.

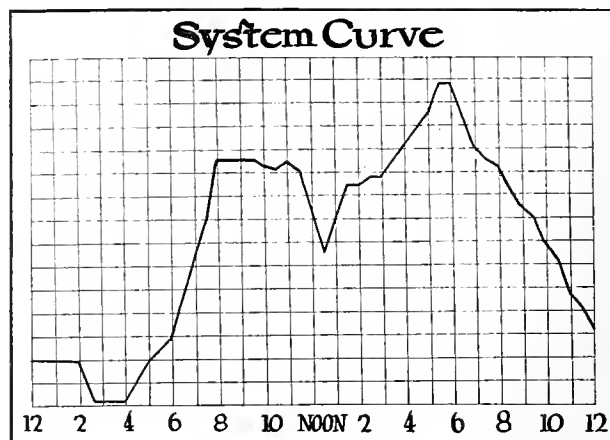


CHART 4.

This is a load curve for a complete system, with as near a maximum peak of lighting as could be obtained. From this curve it is evident that the evening cooking load in some sections during the winter is going to come at practically the same time as the lighting peak. I am convinced, however, that this is not a serious condition due to the fact that there are a great number of electric plants from which an output can be obtained for a short time, far exceeding the maximum demand at the present time. We also have a diversity in the evening cooking peak due to the fact that evening cooking varies over a system and depends upon the living conditions of its customers.

For instance, in the country territory the cooking load will come on early in the morning and earlier in the evening than in the city territory. The same condition will apply in industrial centers, so that an over-all curve of all cooking consumers will be much broader than the chart that is shown here covering ten electric ranges, all operating in the same district where the living conditions are identical. Electric air-heating and electric water-heating will tend to fill up the valleys which now exist when considering electric cooking only.

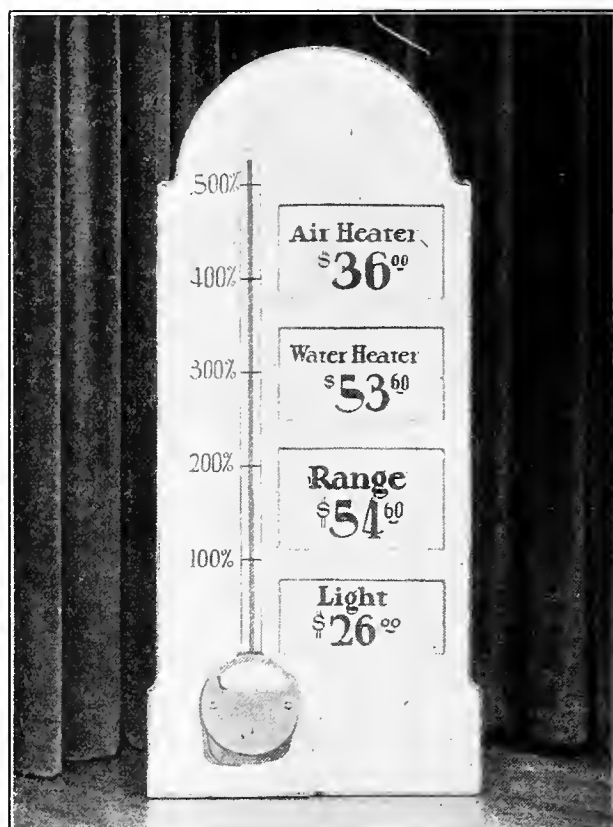


Fig. 1. An electric meter—showing the approximate revenue from lighting only, from an electric range, a water heater, and an air heater, and the percentage of increase from each



There is a lack of information regarding the operating characteristics of the electric air-heating load. Through the National Electric Light Association arrangements are being made for an extensive test to be conducted by the Pacific Coast Electrical Association which will be similar to the range test just completed by the Northwest section and which will have as its first aim the obtaining of all statistics relative to the operation of electric water heaters on metered rates. During the time this test is conducted it is hoped that we will be able to obtain definite information regarding electric air-heating. It is anticipated that this test will show that electric air-heating will have a peak preceding 8 a.m. when the industrial load comes on and that it will taper off throughout the day. This will be caused because the home is cold in the morning with the greatest amount of energy being consumed during the earlier morning hours, and there will be a large diversity during the day.

It would appear that from a financial standpoint the problem of the electric service company is the improvement of the load factor on each separate distribution circuit. By doing this the system load factor will be improved. Is it good business or economy to permit a distribution circuit to exist with a load factor that may be as low as 15 without making a very strenuous effort to improve it, especially when there are appliances which can be placed on these lines by aggressive sales activities that will improve this load factor?

The outstanding facts brought to light by the domestic cooking committee this year was the fact that nine homes were wired for electric service to every one electric range which was sold during the year 1925. This disregards altogether the hundreds of thousands of homes already wired for lighting service which are using only a minimum or an amount of electricity slightly above minimum per month. It is also a fact that the saturation of electric ranges is only 2.3 per cent. It is very apparent that the saturation point of electric ranges is away off infinity. Consider also that 80 per cent of the electric services is to residential consumers and that we are receiving approximately 20 per cent of the possible revenue that can be obtained in this class of service.

You have before you in these residential consumers, gold mines laying dormant awaiting development. Recognizing the importance of this load to the electric service company, the next problem is the question of merchandising policy.

Time does not permit a discussion of this subject of merchandising policy, but there are, however, two points which I would like to discuss. The first is the resale price of appliances. The resale price should be one which will permit any merchandising firm to participate in this business. Any deviation from recognized business ethics in this regard is an admission of weakness and should not be tolerated. Special sales, however, are recognized as good business and should be conducted at various times with special prices for a limited period, not only to stimulate buying but also to stimulate the sales force.

The merchandising department should have a financial set-up whereby the business obtained can be measured. A definite value should be set and credited to this department for the new business obtained, this amount to come out of the revenue earned by each sale. In this way we can measure results by definite merchandising standards. Remember, however, that there is one element, time, which is required in perfecting any policy.

The second point is the question of sales organization. In building up a sales organization it is impossible to go out into the open market and obtain a group of salesmen who immediately will become productive to the complete satisfaction of the electric service company. In my mind, the salesman to represent the electric service company as a rule is an employee in your own organization. It is merely a matter of picking the right man for the job. Remember, however, to train a salesman is not a job that can be accomplished over night; it will take on an average of one year to train a salesman so that he can do justice to his work.

While it is possible to pick good men from outside sources it appears that the most satisfactory results are obtained from salesmen who have been picked for their jobs from other departments, men who are familiar with company policy and routine and have the interest of the company at heart. These are qualifications that have been built up through perhaps years of service to the company and qualifications which you cannot hope to obtain from men who have had sales experience with other companies or other lines.

Let us now consider the position that should be taken by the electric service company in the merchandising of these appliances.

It appears that, inasmuch as a great many of our consumers enter our office only when they make their original application for service, we are overlooking the most wonderful opportunity which could be presented to us when we fail in some way to advise them of the many important servants that can be placed in their hands to aid them in the performance of their daily tasks, and in this way also impress them with our desire to be of service in reality and not in name only.

Recently I have perfected an imaginary invention. This invention provides for a very comfortable chair in which all prospective customers for electric service must be seated before the business at hand is started. The man representing the company will find out what applications of electricity the customer proposes to make in her home. He will then, in a very few words, obtain the interest of the customer by touching briefly on some new application of electricity for her particular use and upon obtaining her attention will press a little button located under his desk and the customer will be lowered very gently through the floor into a very attractive display room of all known electric devices. The customer will be permitted to observe this room of appliances for a moment and will perhaps notice that the room is enclosed completely except for an exit which can be reached after climbing seven

steps. These steps are most important in all sales work and represent the seven steps that must be taken by our customers to realize fully the service that can be rendered by the various electric appliances.

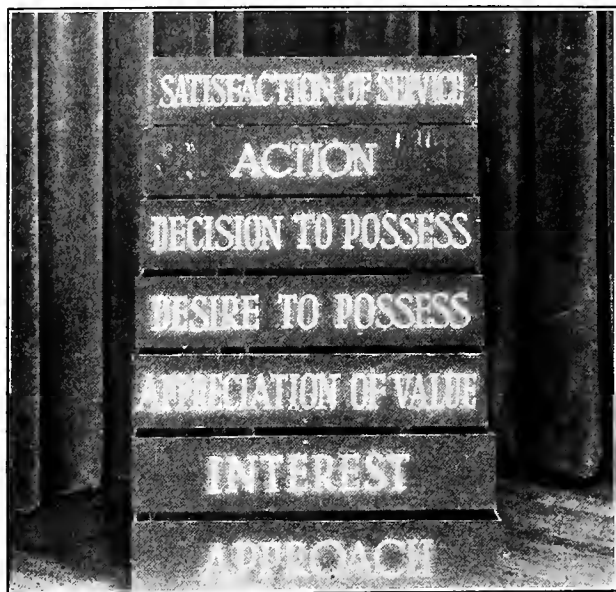


Fig. 2. The seven steps of salesmanship.

A salesman of pleasing manners will approach the customer and carefully lead the customer up these stairs by a presentation of the electrical servants. These steps are:

#### 1. Approach

You have had a salesman approach you and by some untactful remark antagonize you toward him and the firm he represents. Favorable attention or approach therefore generally is determined by the friendly and pleasing impression left by all employees of the company who may have had dealings with our prospect. Approach in this specific instance is a courteous and tactful opening of the subject with our prospect. The second step is:

#### II. Interest

We must have the interest of the prospect or we cannot continue with the sale. It is very easy to determine when we have obtained this interest inasmuch as it will be reflected very definitely by the attitude of our customer. Upon being sure that we have obtained the interest we will proceed to the third step, which is:

#### III. Appreciation of Value

Our prospect now must be impressed with an appreciation of the value of the appliance. We cannot hope to proceed further until we are convinced that there is an appreciation of value, and at the same time we still have far to go. The next step is:

#### IV. Desire to Possess

We are reaching now the most difficult part of our task, and the salesman is being put to the real test. A desire to possess may be created by representing the specific appliance as being used by the prospect and assisting her in her tasks. A desire to possess does not mean that she is going to buy. She must proceed to the next step, which is:

#### V. A Decision to Possess

All prospects are prone to put this decision off, and it requires real sales ability to influence this decision and to pass on to the next step, which is:

#### VI. Action

Where the decision to possess is capitalized, this deals with the final details from the quoting of prices and terms to the closing of the sale with the name on the dotted line.

#### VII. Satisfaction of Service

The seventh step is satisfaction of service that has been rendered, not only from the appliance itself, but from the company.

There is no royal road to salesmanship, and these seven steps are taken by everyone in the making of a purchase.

I next would like to point out a very important reason why you need a strong sales organization in order to build this appliance load.

#### Where Does the Dollar Go?

Here is a model of the American dollar. I would like to call your attention to this dollar as representing the annual income of an American family. Have you ever stopped to consider where this dollar goes? I have analyzed budgets on the cost of operating homes and arrived at these figures, to which I invite your attention.

Ten per cent of this dollar goes into savings, 20 per cent of this dollar goes for rent, insurance and upkeep of the home, 20 per cent goes for food, 20 per cent for clothes, 10 per cent for advancement, which includes health upkeep, doctor, dentist, recreation, clubs, charity, gifts and the church. Only 20 per cent of the dollar remains, and this 20 per cent is used for fuel, light, laundry, telephone, help, automobile and replacement of obsolete equipment, such as furniture or new furnishings.

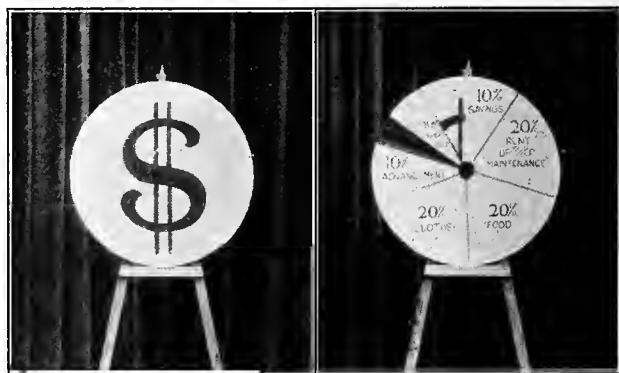


Fig. 3. The American dollar—and how it is divided into the average family expenditures for the year.

This 20 per cent I would like you to consider in two lights. First, that an average of approximately 1 per cent of the 20 is used for light, 5 of the 20 is used for fuel, showing that electricity is obtaining only 20 per cent of its possible revenue that is awaiting it in the home. Six per cent more of this 20 is used for telephone, laundry and help. This leaves 8 per cent of the 20 for replacement of furnishings or new equipment and out of this comes the automobile. You readily can understand then that we, in the sale of electric appliances, are in competition with every other thing that is for sale. You will also perhaps agree that people are more

apt to spend the little money they have for objects which have the pleasure appeal before they will buy objects for utility reasons.

If these figures are correct, and I believe that they are a good average, the average size family with a \$250 a month income will have approximately \$20 a month which can be expended for upkeep of automobile and purchase of new equipment. You perhaps can readily see the reason why the credit business has grown by such leaps and bounds. It is true that the average person in making a purchase of new equipment is not buying on the basis of the complete purchase, but is buying on the basis of the first down payment. It might be that the article purchased will cost ultimately \$250, but if the payment down is 10 per cent they are in reality only making a \$25 purchase.

Next, after observing these facts, we desired to know what was being done to sell these appliances to our electric consumers. Here is a copy of the Saturday Evening Post. Go through it page by page and find advertisements covering almost every known object for sale and we do not find a single advertisement calling attention to electric ranges, electric water heaters or electric air heaters.

Next take your Sunday paper. Again we find attractive advertisements but nowhere do we find advertisements on ranges, water heaters or air heaters. There must be a reason for this. The advertising would be there if there were a demand for these appliances which would justify the expenditure. The advertisements which do appear there time after time are undoubtedly justified by purchases.

sent to show what can be accomplished by central-station merchandising. The tabulation (Fig. 4) shows the number of ranges that were sold in a territory by months for the past four years. You will note that from May 23 to April 25 the sales were practically the same by months. During this period one salesman was covering this territory and, due to its wide extent and other work that he had to do, the results were as shown. In April, 1925, an additional salesman was added and in May still another. The activity of these three men from May 1, 1925, to date has been confined to the sale of electric ranges, water heaters and air heaters. During the period from April 25, 1925, to Jan. 1, 1926, eight times the number of ranges were sold as compared with the same period of 1924, and the sales force was increased only three times. It is also a fact that during the period previous to April, 1925, the sales by electrical dealers in this territory were practically none, while during the period following April 1, 1925, the dealer sales averaged approximately one-third of the ranges sold, or exceeded by nearly double what had been accomplished by all forces previous to 1925. In this territory in which there are 7,000 domestic consumers, 356 electric ranges were sold during the year ending May 1, 1925. This total is 5 per cent of the consumers in the territory. Compare this 5 per cent, if you will, with 2.3 per cent saturation over the territory covered by the P.C.E.A. on Jan. 1, 1926.

Like Results in Electric Air and Water Heater Sales

There is no question but that had the sales activity continued to date as existed previous to April, 1925, the sale of electric ranges would have continued the same. While this tabulation shows only the results in electric range sales, the same results were accomplished in the sale of electric water heaters and electric air heaters.

Another outstanding fact and one that means cold cash is that the revenue received from the heating and cooking accounts during the year from May 1, 1925, to May 1, 1926, was 60 per cent greater than the revenue received from heating and cooking accounts in this same territory during the previous year.

We are justified in expecting that the revenue for the year ending May 1, 1927, again will show the same increase over the revenue received during the year ending May 1, 1926. I can recall example after example which will point to this same conclusion.

I wish only to call your attention to a campaign which recently was conducted in merchandising where the problem was very similar to our own. A campaign of two weeks duration sold more appliances than had been sold previously through regular channels over a period of two and a half years.

A secondary distribution line in a strictly residential section was picked out for analysis. It was found that this line was served from the primary circuit by a total of 50 kw. in transformer capacity. (Fig. 5.) It was found also that this particular secondary line served 175 lighting consumers. The accounts of these particular lighting consumers

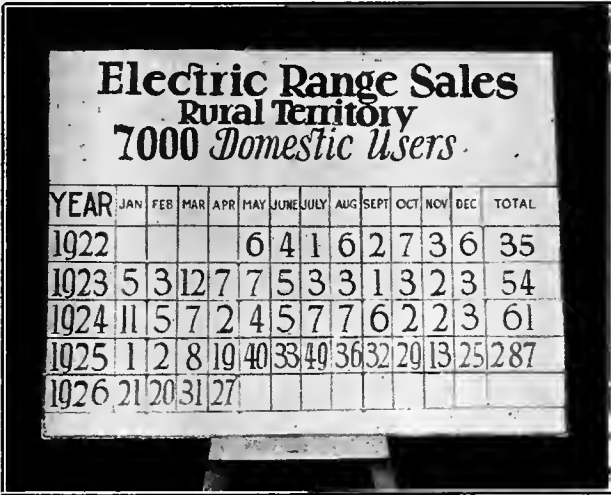


Fig. 4. The number of ranges sold in a particular territory for four years, shown by months.

The electric range, water heater and air heater are in competition then with all these devices which are advertised and all in competition for this small 8 per cent that is left for the family budget. If the electric range, water heater and air heater are to obtain their just share of this 8 per cent, it is necessary that someone come out with sales activities which will offset the competition.

Here are a few figures which I would like to pre-

were analyzed and it was determined that the annual kw-hr. sales were 65,100. The annual revenue was \$4,550. From these figures it was easy to determine that the average consumption per consumer was \$26 per year and that the load factor for this particular secondary line was 15 per cent. Here is a line with an investment which is practically idle 85 per cent of the time! Inasmuch as it is im-



Fig. 5. Representing a pole line serving 175 lighting consumers, and the revenue derived from it—as compared with the revenue possible from the same investment when each of the customers adds range, water and air heater to the line.

possible to move this line and use this investment where it will give a return during the 85 per cent of the time that it is useless, our problem then is to develop additional load on this line. We will presume, therefore, that over a period of time we can load this line with 44 ranges, 44 water heaters, and 44 3-kw. air heaters in addition to the present lighting load. This is done with no additional bookkeeping to handle these accounts. By further analysis of actual distribution and operating conditions it was determined that on the basis of the load involved that it would require 135 kw. in transformers to serve this load. Remember that this is done with no additional poles or any additional lines to maintain. On this basis then the annual sales would amount to 311,500 kw-hr. and the revenue would be \$10,669. Therefore, the average revenue for the 175 consumers has increased from \$26 to \$60.96, an increase of over 100 per cent with no additional collections to be made. At the same time the load factor has improved by nearly 100 per cent and is now 26 per cent. The results accomplished are more revenue per dollar capital.

## Winning Customer-Relations Essay

THE essay written by DeWitt Scott, power salesman, San Joaquin Light & Power Corporation, was judged the best of all submitted in the contest conducted by the Customer Relations Committee of the Pacific Coast Electrical Association prior to the recent convention of that organization. Mr. Scott's essay follows:

### The Proper Treatment of Our Customers

Poles, wires and generators do not in themselves make a public utility. We can pore over the balance sheet, but we must turn to the personnel to find the spirit, life and destiny of the institution. Upon the human element of the organization rests the success or failure of the business. Our corporation is an artificial person, whose personality and character is a composite of the many characteristics of the employees. This fixes our responsibility, as individuals, to uphold and develop our part in this job of creating good will with the public.

Here lies the value of this little booklet, "Proper Treatment of Our Customers." Since the beginning of the industry engineers have made rapid strides in development of better equipment, experts have devised better rates and methods of accounting; in fact, these phases of the industry have received considerable attention while the efficiency of the individual has been perhaps neglected. Now, however, the employee is receiving that which he needs,—expert instruction in matters which mean even more to him than to the people he serves. The instructions in this booklet have added value because of their simplicity. The idea behind customer relations is so broad in its scope that we are apt to overlook detail. I find myself now, among other things, carefully avoiding the phrase "you will have to."

One word which I believe was overlooked is "loyalty." Nothing inspires more confidence in the company than the loyalty of an employee. Those who do not possess this quality are out of place and in justice to themselves and the company should seek other work. . . . Courtesy and affability among the employees is the seed of good customer relations. We are each like a cog in a huge machine and as we mesh in with the fellow next to us kindness and co-operation is like the lubricant applied to the working parts of the machine, lessening the friction, making everyone's job more easy and pleasant yet building up the efficiency of the machine as a whole.

I was suddenly startled, recently, by a harsh voice, exclaiming, "Do you know that YOU nearly set fire to my house?" Looking up from my work I saw a total stranger leaning over the office rail facing me accusingly. I had sudden visions of a house on fire, frantic fighting and now a mistaken identity in me. After a few questions it appeared that the wood had been charred on the side of his house by the electric light wires. He was assured it would receive immediate attention and the name and address were rushed to the line foreman who hurried to the scene. It proved to be blackened spots, caused by the torch of the man who wired the house when working on the ground wire three years previously.

This complaint was caused by what I believe is the cause of practically all of the antagonism against the industry,—a lack of understanding. Where ignorance is found, skepticism prevails, which fosters antagonism. The only cure for this is the facts—plain, frank, open facts. . . . When I meet a man who is antagonistic toward the company, I feel the very remarks he makes are evidences of his lack of knowledge of the true conditions.

The best definition I have ever read of public relations is, "giving the public a square deal, and being sure the public knows it is getting a square deal." Our company is unquestionably doing the first, and our work lies in the latter. We can reach the public through the press and by the spoken word. The former is far-reaching, but lacks the warmth, friendliness and intimacy of the latter and I therefore think one of the most important steps toward better customer relations is the further education of employees in the basic facts of the company. This will inspire confidence which will be imparted with sincerity to all with whom they come in contact.

Is it not up to every one of us to wage a war against misunderstanding? In this way only can friction and enmity be overcome. For in the end we should always remember that, "a thorough understanding means long friendship."



# Politics and the Electric Light and Power Industry

By Franklin T. Griffith\*

President, Portland Electric Power Company, Portland

**P**OLITICS, which is simply the administration of the business of all of us as a community, no longer feels the influence of the great political parties as it did in the past. Lack of organization in these parties for the formulation of principles and for declaration in favor of definite public policies has resulted in the growth of other organizations which are doing today exactly what the political parties did in the past. One of the most important of these is the National Grange, representing as it does the development of agricultural interest and the protection of the rights of the farmer. Because there are no other agencies to perform the task this organization has led its membership outside the realm of agriculture into politics, in the sense that political questions are those affecting the great mass of the people as a whole.

A year ago leaders of the electrical industry had the pleasure of listening to the Master of the National Grange at the San Francisco convention of the National Electric Light Association. He spoke in a most friendly way to this industry. He spoke favorably about the need of extension of electric service to all the farms of the country, and he urged the representatives of the electrical industry to take into consideration the rights and aspirations of the farming community to bring to it as rapidly as possible the blessings of electric service. He said that he was not in favor of federal operation, ownership or management. He stated that he believed that the men of the light and power business had the ability, the willingness and the integrity to conduct this business honestly; to treat fairly all men in all walks of life—farmers and city dwellers as well.

Unfortunately the opinions as expressed by the Master of the National Grange do not appear to be true of the state Master in Washington. Before a recent meeting of the Washington Grange this man made a statement which will serve as my text. He said:

**O**CCASIONALLY a man in high public office, through misinformation and misunderstanding, makes an attack upon the light and power industry. In this article Mr. Griffith draws upon his wide experience in the business to answer such an attack, after appealing to the industry that it consider such expressions of opinion as were made in this case to be based upon honest convictions.

ship, corporations who will tax our people for all time to come taking out of this state a steady stream of wealth. There is but one way to protect this heritage and that is through public development. Public supervision has failed, for there are so many devious methods of milking the profits before the public service commission gets in its work that the regulation amounts to very little. The examples of municipal development have proved to all fair-minded citizens that regulation would not hold down rates, and that the only way for the people to enjoy the benefits of this heritage is for them to develop it themselves and distribute it at cost.

The Federal government can do this and should so develop the great power projects which will serve whole states or groups of states. In this state the provisions of our constitution with reference to bonding make state development almost impossible. Our cities are allowed to develop power for their own use, but only the largest can afford to make the investment. It is unfair to deny the people outside of the cities the rights which the people of the cities enjoy. A measure should be enacted enabling the country people to form power districts under which they can enjoy the same rights as the people of our cities, and cities and towns should join into such districts if desired.

I take it that this is an expression of honest opinion, based upon a conviction honestly arrived at and representative of the opinion of many members of that organization.

Now, first, this charge that the power trust, so-called, is reaching out into all the states of the Union to control for its immediate purpose the water powers of the country. We in the electric light and power business know that is not true. The Grange does not.

From a national standpoint the Eastern and Western view of this question is entirely different. It is true that the great bulk of the undeveloped potential water power of the country is west of the Rocky Mountains. But it is equally true that the great bulk of the demand for electrical energy is

Probably the biggest trust of all times is the power trust. Reaching out with its subsidiary corporations into every state in the Union, its immediate aim is to lay hold on the water power of the nation and set the never-failing streams to pouring gold into its coffers. A little band of congressmen whose chief aim is to serve the people have so far prevented giving the nation's largest power development away, but the fight is far larger than Muscle Shoals. It involves forty million undeveloped horsepower in the nation, a field for exploitation so vast that it dwarfs all others.

Washington has more water power than any other state in the Union, but at the present rate of filings it will soon be turned over to private owner-

\* Excerpts from an address before the Northwest Electric Light and Power Association Convention, Spokane, Wash., June 14-17, 1926.

east of the Rocky Mountains. We out here are accustomed to talk so much about water power that we think electric power is produced mostly from this source. That seems to be the idea advanced by the Master of the Washington Grange.

Now what is the fact? Of the fifty million horsepower in stationary engines or units in the country four-fifths are steam. That does not include all of the motive power in locomotives other than stationary power. If all the water powers of the country were developed today the energy resulting therefrom would be insufficient to supply the present demand for power produced by steam.

Steam—coal—fuel is now and for all time, until we change the entire method of production of power, will be the primary source of power in this country, not water power. That will be true from an economic standpoint for the next decade or two decades because, by reason of the fact that the great bulk of our population is east of the Rocky Mountains and the great development there also, the power demand will continue to be far greater in the eastern section of the country than here in the West.

The power development of the future is steam, not hydro. Let us not lose sight of that fact.

There is no purpose on the part of the so-called power trust, which is that loose aggregation of men engaged in the power business, to misrepresent their problems. They do all their business in the open light of day. There is less concealment about the operations of this industry than any other industry in which men are engaged. It is the most rapidly growing industry on earth today. It is growing in the full light of reason. I think this industry agrees that the policy of full publicity in its plans, purposes and methods is the right policy because it is charged with a public obligation and the public has a right to know what it is doing. All developments of this industry are being made for the primary purpose of extending service as a business proposition everywhere that it is practical from an economic standpoint to extend it. To make money, to be sure, but money made reasonably, honestly and limited by law to a reasonable return only upon the actual value of the property devoted to the public service.

#### What Are Men in Business for?

This "stream of gold that goes into the coffers of the power companies!", how does that differ from the stream of gold going into the pockets of the farmer, the manufacturer or any other kind of business man? What are men in business for? They want to make profits; they want a reward. There is no purpose in business unless there is a profit to be made. Why should the aim of the electrical industry be condemned because it wants to conduct its business for the purpose of making a reasonable profit? Further, when this industry asks a profit it is not asking an unlimited rein to its fancy or imagination, to take advantage of each and every turn in the cycle of business so that it may profit by the distress of others. That can be done and is done in every type of business except

public service. Profit in this business is limited by law to a reasonable return. Can anybody object to that?

"By devious methods you may milk the profits before the regulating body gets ahold of it," says my friend. What are these methods? How can they be employed? We know that there is no opportunity for "devious methods" in public service. How many members of the Washington Grange would agree with this pronouncement had they known when they heard it that every dollar of receipts and disbursements is a matter not only for inspection of the Public Service Commission but may be made an absolutely open public record. How many of them know that the public service commissions of the various states have the power to determine by actual appraisal the value of the property devoted to public service, and that we are confined not to a return upon what we think to be the value of the property we are using for the benefit of the public, but to the value determined by the commissions selected for that purpose?

#### Without Profit the Machine Will Stop

Where is the opportunity by devious methods to create a fictitious value with that power vested in the public service commissions from one end of the country to the other and exercised by them? Every utility has as a rate base only the actual value of the property used and usable in the public service. If that base has been determined, can any man reasonably criticize the right and the duty of operating the property to earn a reasonable profit on that value? In its final analysis that is the criticism advanced by the Master of the Washington State Grange. We want to pour gold into the coffers of the utilities, reasonably. Without profit the machine will stop. Without profit the desire of men to advance will cease. We must have profit to continue. We cannot stand still. There is no such thing as standing still in this business. You retrograde or you advance and the whole history of the industry is that it does advance. To advance it must have a reasonable return.

Again, my friend says "that at the present rate of filings all of these water powers will be gobbled up by the power trust." Disregarding the national aspects of the question and applying it only to the Northwest where there is so much undeveloped water power, this statement is based upon fallacy and a misunderstanding and misapprehension of the actual condition.

It is a constitutional provision in all but four or five states of the Union that the common law of England is the law of the state until and except when expressly abrogated by statute of the state. So it is with the doctrine of riparian rights which dates from the days of the Justinian Code and is the foundation of water laws as we understand them today. This doctrine recognizes that the right to the use of flowing water inured to the owner of riparian land and that that right was to have the water flow as it was wont to flow by nature unpolluted in quality and undiminished in quantity. That common law has been abrogated in the Pacific Coast

states. We have what we call the doctrine of appropriation.

In 1876 the federal government, being the owner at that time of vast areas of land in the thirteen western states, lands upon which numerous streams were flowing, passed what is called the Desert Land Act. Under this measure it is provided that the federal government as a riparian proprietor, as distinguished from its right as a sovereign government, permitted the appropriation of all waters upon the public lands of the United States then owned by the government, excepting so much as might be necessary for domestic use only of the riparian land.

### The Theory of Appropriation of Water

Based upon that federal statute the states of the West have developed the theory of appropriation of water. Logically they contended that, if the government divested itself of title to the flowing water, that title then would rest with the states as commonwealths, not as riparian proprietors. So the states of the Northwest have declared that all title to water in running streams, lakes and navigable waters is vested in the state, and have passed appropriation laws under which it is possible to appropriate water for beneficial use.

It is a curious thing not recognized by most of those who discuss water-power development that the right of the state to control the development, appropriation and use of water is only half the story. Eighty-five per cent of all the potential undeveloped water power of the United States is still subject to federal control; not by virtue of the ancient laws of riparian ownership but because in using water for beneficial purposes land must be used in its development. If water is diverted from a stream, or a structure is built in its bed such as a dam, this structure must rest upon land. Then the question of the ownership of the land becomes an important factor.

If any portion of the water that is used, or any portion of the structures that are built for the purpose of developing water, touches federal land, then application must be made to the Federal Power Commission for a permit. Moreover, the Federal Power Commission has absolute power over the granting of permits for the development of water power upon navigable streams wherever they are, whether public lands are involved or not, purely by virtue of the constitution giving Congress the power to regulate commerce between states and therefore the waterways used for this commerce. Thus permits must be secured from the Federal Power Commission if a development is on a navigable stream or if a square foot of federal land is used. So the states today, in passing their laws permitting the appropriation of water power, grant only a portion of the right necessary to make the development complete. The grant of the water right by the state is an empty grant unless there be accompanying it the grant from the higher authority, the federal government.

What possibility of exploitation is there to one securing a permit under the federal law? It is con-

ceded that power development should be made just as rapidly as there is need for it; indeed, following the policy of the progressive companies of the West, in advance of any possible need. Thus the industry always will be ready unless crippled by vicious legislation, to take care of any possible demand for additional service. That is the aim and ambition of every executive of this industry today—at all times to be able to serve to the absolute limit at rates only sufficient to provide a reasonable return upon the money actually invested. Who can object to development on that plan?

When a development is undertaken this industry is compelled to make a full accounting to the Federal Power Commission of the kind and character of the development. Before a spadeful of earth is turned, plans must be submitted to this commission so that it may determine whether these plans are best calculated to utilize to the utmost the latent power we are seeking to appropriate. We cannot be permitted to go ahead and make an improper, imprudent or unwise development. Further, a report of every dollar of expenditure must be made so that the federal government at all times in the future will know exactly what the development has cost the permittee or licensee.

The federal government grants a license for fifty years with a right to a renewal at the expiration of that time from year to year, provided it does not desire at that time to take over the development itself. It may have the power—and we submit to that when the contract is signed—to take the development from us, with all the necessary appurtenances to make it a going concern, at cost less depreciation.

### Drastic Conditions Imposed by Federal Power Act

The Federal Power Commission has the right, if the states in which the development is made fail to exercise their authority to regulate rates as between various classes of consumers, to determine the reasonableness of rates for the public use. Further if by any chance, there be an exorbitant profit secured by the development, there is a provision in the Federal Power Commission Act that there shall be an expropriation of that excess profit and the government may reduce the valuation of the whole project by such an amount as has been received in excess of a reasonable rate of return. Indeed, it requires courage of a very high order for men engaged in the light and power business to accept the provisions of the federal law. It is only because we as a class of men have confidence in the fairness of our own nation that we are willing to submit to the drastic conditions imposed upon us.

Where, then, is there an opportunity to exploit the public? If exploitation in the mind of the Master of Washington Grange means receiving an exorbitant rate for the class of service furnished and making an undue and unreasonable profit, how can it be done? There is so much opportunity in this business for good to the whole mass of the people, if we could devote our minds and our thoughts and our talents to the development of this industry, to the extension of our services, to

the steady cheapening of the cost, instead of combating such unreasonable attacks as the one under discussion here.

### The Facts About the Ontario Experiment

The granges of Oregon and Washington are advocating public development of water power, but their primary purpose in the beginning was the extension of electric service to the farm. Recently there has grown up among the farming element generally and among the granges a belief that in Ontario, Canada, there has been a wonderfully successful experiment conducted under public ownership which has resulted in untold advantage and prosperity to the farming community. They say, "We want what has been done in Ontario here in Oregon and Washington. If the electric light and power business does not give it to us, we as a body politic representing the people are going to combine our resources to make these developments and carry lines out over the country so that every farm will be lighted by electric energy."

How many of them know the facts? How many know that the National Electric Light Association has made a complete report of the Ontario situation? In addition, there has been a recent report by a committee in Minnesota charged with finding out the truth. In the province of Ontario 2.52 per cent of all the farms now are receiving electric energy. Only recently the Oregon Committee on the Relation of Electricity to Agriculture, supported largely by the utilities and composed of representatives of the agricultural colleges, Grange members, the Farmers' Union and the utilities, reported that electricity is extended to the farms of Oregon to an extent seven times as great as it is in the Province of Ontario. In Oregon more than 15 per cent of the farms are receiving electric energy; in California more than 30 per cent, and in Washington fully as many as in Oregon if not more. There has been seven times the advancement here under private control and development that there has in Ontario which is held up as such a shining example.

### What the Ontario Farmer Pays

Furthermore, the farmer in Ontario who intends to receive service must agree at the outset that for twenty years he will pay a fixed charge, whether he takes energy or not, ranging from \$3.11 to \$11.88 per month and that this charge becomes a lien upon his farm collectible as are taxes. He pays for his energy after that, and the initial rate he pays is 8 cents. Only after he has used more than 30 kw-hr. per month does he get the 2-cent rate. There are over a thousand farmers in Ontario today who are paying the fixed charge, because in the enthusiasm of the moment they signed a contract imposing a lien for twenty years upon their farms, and have not had sufficient funds in the meantime to install the wiring necessary to give them electric service. Moreover, in addition to these heavy charges the province itself puts up 50 per cent of the cost of all rural extensions. Yet only 2.52 per cent of the farms are electrified as against 15 per cent in Oregon.

It would seem that this dream of publicly owned water power is simply an appeal to the imagination based upon the fallacy that something will be cheap. There is no such thing as a cheap hydroelectric development. Every development in the West is an expensive one in the matter of capital involved. Each time more power is needed we must go farther afield for power sites, and we are going to find increased difficulties from an engineering and financial standpoint.

A totally different aspect is placed on the situation when the relative progress made in steam-power and water-power machinery is considered. The efficiency of water wheels is now 85 or 90 per cent of the theoretical maximum and hardly can go higher. Can the same thing be said of steam? Efficiency in steam-power production has increased enormously in the last decade, and no one dares predict as to the future. Steam power is now the major source of energy in the production of electric service and always will be. Coal is still the master of production of energy and as the possible production of kilowatt-hours per pound of coal is increased, steam power will become more important and the importance of hydroelectric power relatively reduced.

### The Columbia River Development

Reference is made to the possibility of making a great development on the Columbia River. While this stream holds great possibilities for power development there are no sites economically feasible of development under present conditions to meet present market requirements. It is impossible to develop a great power plant on the Columbia River unless there can be secured in advance of the development a sufficient primary load to pay at least a portion of the fixed charges upon such a development. My friend says that all the energy from such a plant would be used by industries which will flock to this country just as soon as they know that energy can be secured at a low cost. Energy cost means comparatively little to the average manufacturer; reliability of service means infinitely more. It is only in the case of those energy-consuming enterprises in which energy represents the major cost of manufacturing that low cost power is the moving consideration in determining the location of the industry.

Bear in mind, with the possible exception of Niagara, energy can be produced and sold and is being produced and sold in these Pacific Coast states as cheaply as it is in any other section of the continent. We have cheap power as it is today, and we are willing to make such additional provisions as the market requirements may demand. Each and every company is doing all that it can to create new markets. It is to the advantage of this industry to create every market it can for the use of power, to keep its developments in advance of any requirements, to be ready at all times to meet the increasing demands of the public with energy at the lowest possible rates. It is my opinion that we are accomplishing this most important task.



# Merchandising Electric Bake Ovens

By R. W. Faville

Sales Engineer, Northwestern Electric Company, Portland

**T**HE housewife with her electric range, toaster and kindred appliances has shown a growing attention to hygiene in the manufacture of those food products she purchases from the baker. In turn, the baker to satisfy the demand for cleanliness not only has been quick to adopt these new processes of mixing that are the most sanitary but also is learning that the electrically heated oven insures cleanliness and produces a uniform product that cannot be surpassed and that these features of his business can be capitalized with good effect.

From the central-station standpoint, the dollar-and-cents value of tying in the activities of the domestic electric-range salesman with the wholesale baker cannot be determined, but the Northwestern Electric Company, Portland, knows it to be of material benefit to both and a great help in exploiting heavy-duty baking equipment. The company believes the electric bake-oven load is good business, and with the intent of interesting others in this class of commercial activity some recent results are recited in this article together with a discussion of some of the factors entering into the securing of such business.

The last six months of 1925 brought a phenomenal growth in bake-oven load to the lines of the company. The addition during this period totaled 530 kw. in capacity through which is realized a yearly revenue in excess of \$12,000. This increased load is made up of ten oven installations of from 18 to 220-kw. capacity each, the largest being a full traveling oven capable of producing over 2,000 loaves of bread an hour.

## Cost of Fuel Offset by Other Advantages

In Portland we are confronted with difficulties in the cost of operation, and it is assumed that each utility company has this unfavorable condition to overcome. For example, here the cost of gas is 55 cents per 1,000 cu.ft., and wood is selling at \$5 or \$6 per cord. On a B.t.u. basis, therefore, the cost of electric service is higher than wood or gas, but we have found from experience that gas is but little cheaper. There are few oil-fired ovens here, but in the case of one which is installed alongside of an electric oven the cost of operation is greater than the electric. Our main competition, therefore,

**A PROFITABLE field for developing the industrial heating load has been found among the bakers by the Northwestern Electric Company, Portland. The author, who has specialized in this activity for the company, here gives some interesting facts about the value of the load, how the business was secured, and operating data on typical installations.**

is with wood, but, notwithstanding the higher operating cost of electric ovens, their advantages outweigh the disadvantages of higher cost manyfold.

These advantages of the electric oven over other types may be listed as follows: ease of operation, less shrinkage, uniformity of size and color of the product, cleaner operation, portability, flexibility, saving in labor, and elimination of steam injection. Upon each of these advantages taken

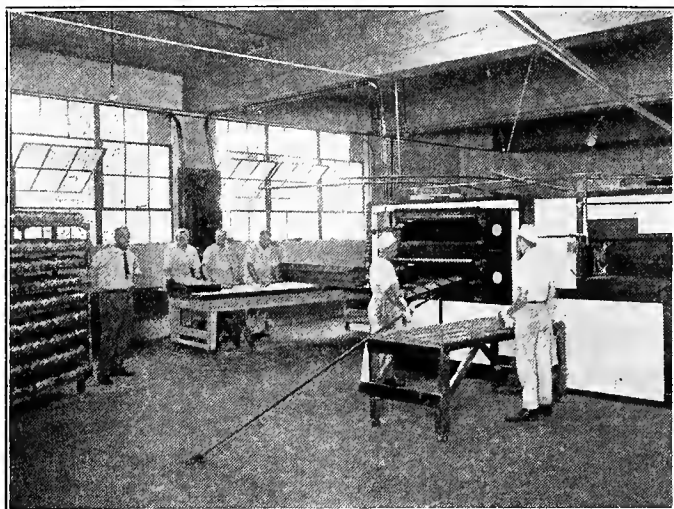
as a subject a separate article could be written, but space prohibits at this time and the present discussion will be confined to a general consideration of certain types of electric ovens, with operating data given on certain typical installations.

## Types of Ovens and the Traveling Oven

Electric ovens may be divided into three types: the reel type, in which the bread trays revolve within the baking chamber; the shelf type or peel oven, which is the best known type, with one or more baking chambers or decks with heating elements above and below each deck; and the traveling type, in which the bread trays are conducted the length of a long baking chamber while the baking process is completed in one trip. The reel-type oven has proved unsatisfactory in this locality, due to the larger air space in the baking chamber and the consequent loss of heat in loading and unloading. The shelf-type oven is very efficient and is adaptable to all kinds of baking requirements so that it is by far the most numerous type in use. The traveling oven can be applied successfully only to the needs of the larger plants, but where it is applicable it effects four major savings: in labor, because it requires fewer men to operate it; in lower first cost, because it can be constructed cheaper than a brick oven of similar capacity; in portability, because it can be moved readily; and in flexibility, because by the easily accomplished addition of sections a larger production requirement can be met.

Because the traveling oven is at present in less common use than other types, a brief description of two recent installations of this type might be of interest. One such oven, for baking cookies only, is 36 ft. long and 3 ft. wide, having a variable rate of travel of the belt through the baking chamber of from four to twenty-four minutes per trip. At

the loading and unloading ends movable baffle bars are placed obliquely so that they may be raised and lowered to suit the size of material placed on the belt. For example, if a cookie one-half inch thick is being baked, the baffle bars are raised one inch to allow clearance. This feature minimizes heat loss and prevents a draft from forming in the bak-



A 50-kw. two-deck oven which because of its satisfactory performance the baker has used more than he anticipated. Next to it may be seen a section of an oil-fired oven.

ing chamber. The conveyor upon which the cookie pan is placed is of the chain type and can be stopped at any point of its travel if this is necessary.

At the unloading end of the oven a cross conveyor catches the pans on their expulsion from the baking chamber and carries them some fifty feet across the room at right angles to the oven. Fans placed underneath this conveyor cool the product so that at the end of this run the cool cookies can be gathered and packed. The economy of operation due to labor saved more than pays for the entire electric service rendered, not only for the oven but also for all other power installed. This oven is installed in the plant of the largest cookie manufacturer in Portland.

The other traveling oven is 56 ft. long and 8 ft. wide, connects 220 kw., and is thought to be the largest such oven in use on the Pacific Coast.\* Its conveyor, which likewise can be stopped at any point in its travel, can be operated at a variable speed of from eight minutes to forty-eight minutes per trip. This variable speed is intended to meet the baking requirements of all classes of product from macaroons to bread. Again the principal saving is in labor since it requires only one man to load and unload. The oven is operated on and off throughout the 24-hour day, and the average daily consumption is 1,300 kw-hr. A demand chart shows the daily peak demand to fall between the hours of 8 p.m. and 1 a.m., a characteristic of distinct benefit to the system load curve. The day operation shows smaller peaks at 10 a.m. and 3 p.m. when pastry and sweets are being baked.

\* A picture of this installation was published in the Journal of Electricity March 15, 1926, p. 236.

The greater number of installations are made of smaller ovens, namely, 18 kw. or less. Our rate allows us to realize a higher return per kw-hr. on an installation of this size, but at the same time this puts us in more difficult competition with other fuels. The fuel-cost difficulty is overcome largely by selling the baker on the cleanliness and sales value of the electric method when the oven is placed in view of the customers. Our success in using this sales argument along with others has been such as to place in service, during the period referred to above, more electric ovens than all other kinds combined.

### Operating Data

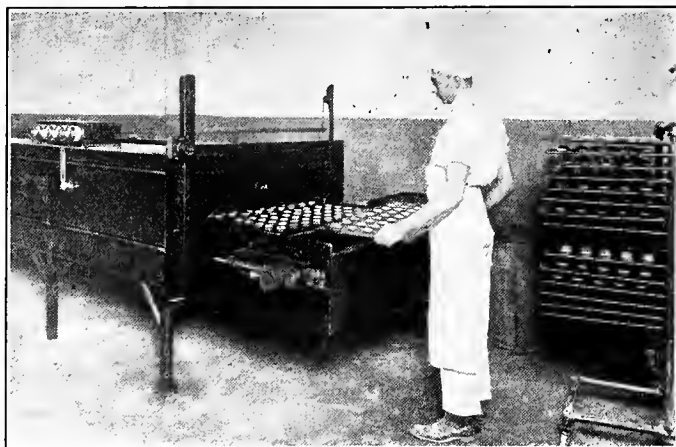
In order to give an idea of the operation of ovens of different classes of customers there follows a tabulation for each of four customers classified as to their size and the kind of business done, in which are included connected loads, kw-hr. consumptions, costs and outputs, with remarks on the manner of securing the business.

Installation No. 1 may be classified as a large wholesale bakery doing a general business including break, cakes, pies and pastry.

### Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven and lights	390.61	817,500	68,125	1.075
Power	37.02	80,484	6,707	2.127

This installation includes two deck-ovens with a connected load of 80 kw. each, and one full traveling oven of 220-kw. load. The capacity of the plant is 4,000 loaves per hour. A substantial saving in labor cost has been effected in the plant through



Loading end of traveling electric oven installed in the plant of the Grandma Cookie Company, Portland. It is used for baking cookies only.

the installation of the electric equipment. In securing the business the power company financed the purchase of the ovens for the customer, and the manufacturer guaranteed performance.

Installation No. 2 may be classified as a specialized bakery manufacturing cookies only.

### Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven	50	108,000	9,000	1.368
Power and light	20.51	8,733	962	4.281

In this installation a continuous traveling oven replaced a rotary gas oven of the reel type. The labor saved by electric operation pays for the entire power bill. The cost per dozen cookies of all classes averages one-fifth of a cent. To secure the business the power company financed the purchase of the oven while the manufacturer guaranteed performance. Help was given also in designing the oven to meet the customer's needs.

Installation No. 3 is a small bakery baking bread only.

#### Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven and lights..	51.17	141,576	11,798	1.318
Power .....	5.34	9,108	759	3.615

A 50-kw., two-deck oven is used, and the customer has an oil-burning oven standing alongside of the electric oven. Because of satisfactory performance the customer has used the electric oven more than he anticipated. In this instance likewise the power company financed the purchase of the oven, and the manufacturer guaranteed performance.

Installation No. 4 is a small retail bakery doing a general baking business including bread, cakes, pies and pastry in a suburban district. It utilizes a 12-kw., two-deck oven, which is about the average size oven for a bakery of this class. It was not necessary to finance the purchase of this oven by the baker, but co-operation with the manufacturer was essential to securing the business.

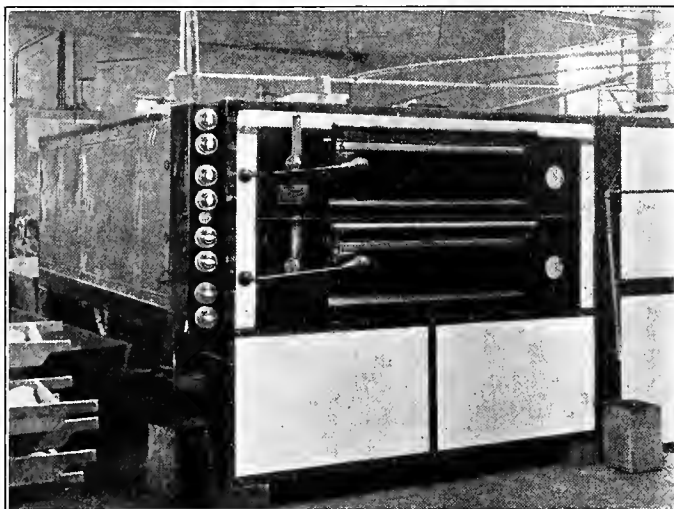
#### Operating Data

	Connected load in kw.	Kw-hr. used in 12 mos.	Average kw-hr. per month	Net rate per kw-hr. cents
Oven, lights and power .....	12.46	23,832	1,986	2.515

#### Conclusion

In general it may be said that the electric-oven load on the lines of the Northwestern Electric Company is a desirable load to carry and has produced satisfactory revenues. This business did not come in over the counter. It was sought actively and

was secured by sound economic sales arguments, by co-operation with the manufacturer in the sale of ovens, and by a liberal merchandising policy which recognized the soundness and practicality of assisting the baker to finance the purchase of his equipment. Such financing was found necessary mainly



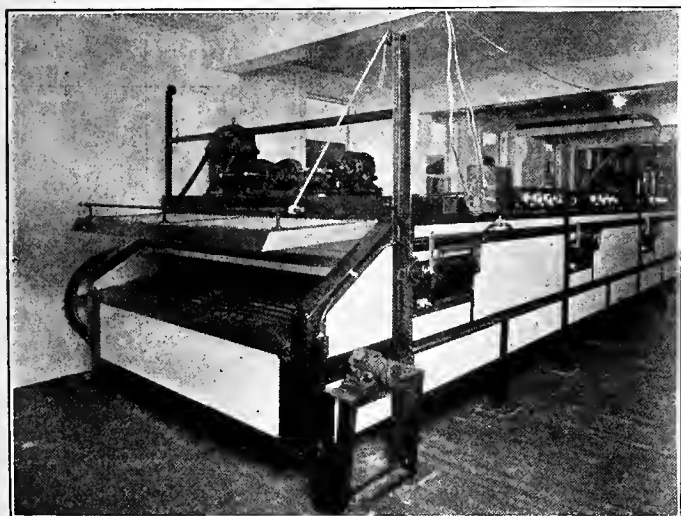
This 50-kw. two-deck oven is installed in a small bakery in which only bread is baked.

in the case of the larger ovens such as are used by the wholesaler. It is believed that conditions in the baking and electrical industries in Portland are not unusual, and that a similar sales activity in other cities can be carried on with like success.

We are, as the oven manufacturers would say, "sold on heavy-duty oven equipment" first, as a builder of load that is in sympathy with our system load curve; second, as a revenue producer; and third, as a sound and practical class of merchandise which is a factor in promoting electricity and its uses in industrial growth.

#### First 60,000-kw. Turbo-Generator Installed in East River Station of New York Edison Company.

—With the aid of two 200-ton cranes, a 60,000-kw. turbo-generator, the most powerful machine on earth, in parts weighing as much as 175 tons each, recently was installed in the new East River Station of The New York Edison Company. Capable of generating 80,000 hp. of electrical energy, enough to light 300,000 six-room homes, operate 31 Panama Canals or pull 47 Twentieth Century trains, the turbo-generator was placed in its final position in what is to be the biggest central station in the world as easily as if it weighed two pounds rather than close to two million pounds. Although this one machine would have supplied all of the electrical needs of New York twenty years ago, it is only the first of nine great generating units to be installed in the East River Station. Its construction was started over a year and a half ago in the Schenectady works of the General Electric Company under the direction of men who in 1890 worked on a 45 hp. generator, then one of the largest in the world. It will take several months to complete the installation of the machine.



Unloading end of large traveling electric oven. Variable-speed device to regulate rate of speed of conveyor may be seen on top of oven.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## System Flexibility Increased by Phase Modifier

### Automatic 10,000-kva. Synchronous Machine Operates Either Leading or Lagging to Maintain Bus Voltage

By E. F. PEARSON and TOM PERRY, respectively engineer and superintendent of Plant Department, Northwestern Electric Company, Portland.

What is believed to be at the present become increasingly difficult due to the time the largest synchronous unit in excessive reactance voltage drop on the United States operating under full this line. It was found that with the automatic control is the 10,000-kva. phase modifier located at Vancouver phase modifier of the Northwestern not only the then existing load could Electric Company at the Vancouver, be carried from Albina but also a 20-Wash., substation. This machine, to-per-cent increase in load could be gether with all auxiliary apparatus handled over this line. This fact, and automatic control equipment, is coupled with the fact that regulation the product of the Westinghouse Elec-in the Portland district was taken care tric & Manufacturing Company. It of adequately by means of synchronous

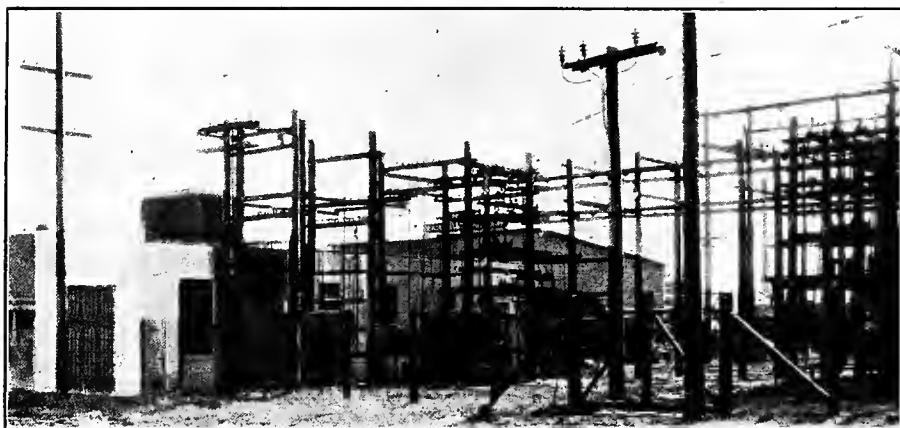


Fig. 1. Vancouver, Wash., substation of the Northwestern Electric Company.

was installed in June, 1925, after a considerable study of all conditions affecting the operation of the company's system. During its 10 months' operation it has fulfilled every expectation and has handled properly all demands made upon it.

The installation of a phase modifier was deemed necessary to relieve generators and tie lines of reactive component load and to regulate voltage. To understand the reasons for locating it at Vancouver it is necessary to know that this load center lies at the receiving end of a 65-mile, 66-kv. transmission line. This line comes from the Condit hydroelectric plant on the White Salmon River, one of the company's principal sources of supply. The Vancouver substation with a capacity of 14,000 kva. serves at 11 kv. a combined town and rural load of which the bulk is in large industrial motors. Likewise it is connected by an 11-kv. line with the company's Albina substation in Portland, about five miles distant. It has been customary in case of failure of the 66-kv. line into Vancouver to serve the Vancouver load from the Albina station. With the increase in load at Vancouver this practice had

motors on motor-generator sets in one of the Portland steam plants, led to the choice of Vancouver for the location of the phase-modifier station.

#### Equipment

The equipment consists of one 10,000-kva., 11-kv., 3-phase, 60-cycle,

720-r.p.m. phase modifier designed to operate at 10,000 kva. leading and 7,000 kva. lagging; one 80-kw. direct-connected exciter; main and auxiliary field rheostats; one starting-duty auto transformer; one main station oil circuit breaker; one starting and one running circuit breaker; one oil-pressure pump for bearing oil; one 125-volt storage battery; and one motor-generator charging set for the battery. Automatic control is effected through a switchboard of five panels two of which, the field panel and pump control panel, are mounted separate from the main board.

All this equipment is housed in a concrete building placed adjacent to the substation grounds. The phase modifier unit is connected through the station breaker to the 11-kv. outdoor substation bus. Through the fan action of its rotor, cooling air is drawn through a sheet-metal duct in the side of the building and discharged through an outlet louvre in the roof. Concrete partitions separate the main room, where the unit and switchboard are located, the circuit breaker room, the auto transformer room, and the battery room. Circuit breakers and connecting cables are enclosed in concrete cells with sheet-metal explosion doors and panels.

#### Operation

As previously mentioned, the phase modifier is built to run leading or lagging and is controlled so that the loads carried by it vary to maintain a constant pressure of 11 kv. on the bus. Generally on week days when the load is normally heavy the unit runs leading while during light-load periods on Sundays and holidays it runs lagging. Thus it operates both as a synchronous condenser and a synchronous reactor. A load-limiting device prevents the unit from overloading.

The automatic control is designed to

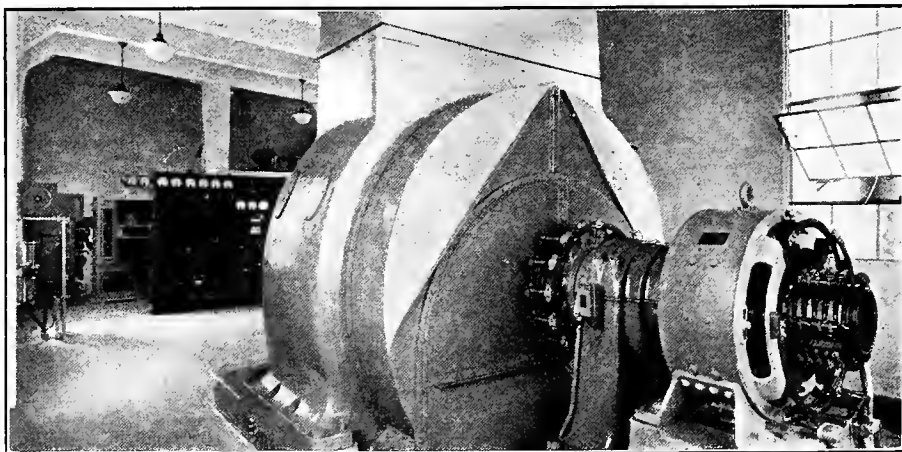
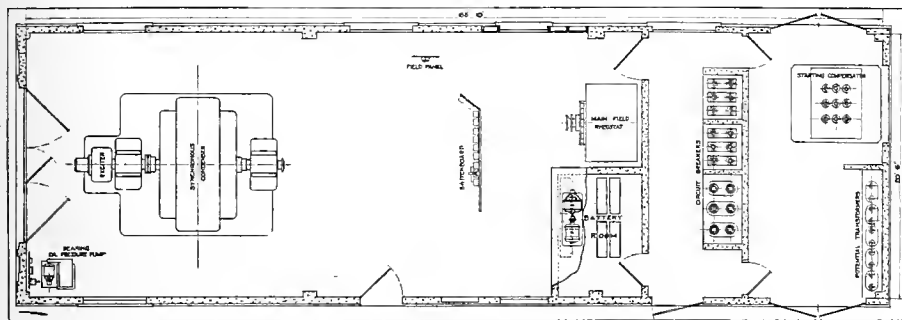


Fig. 2. Interior of Vancouver, Wash., substation of the Northwestern Electric Company showing synchronous machine and part of full-automatic control equipment.



take care of a variety of conditions and emergencies. It will shut the unit down when the trouble occurs and after the trouble is cleared start it up again. The following conditions are cared for automatically: extreme low voltage or failure of voltage; extreme

which permitted a voltage slightly below normal but within practical limits. During this emergency and without the phase modifier it would have been necessary to drop considerable load to maintain the necessary minimum voltage. Again, on one occasion due to a



Floor plan, Vancouver, Wash., substation, Northwestern Electric Company

high voltage; overheating of machine stator and field as determined by thermal relays; phase reversal; and underloads for pre-determined length of time. The control will shut down the unit and lock out the station breaker under the following conditions: failure of unit to transfer from starting to running position; extreme overload as determined by induction-type relay; overheating of machine bearings; overheating of machine stator as determined by imbedded temperature coils; failure within the machine affecting differential protecting relay; phase failure; and continued excess current in starting compensator. After the station breaker has been locked out it is necessary to reset the lock-out relay before the machine again will operate.

The full-automatic control was decided upon to secure economy of operation by avoiding the necessity of maintaining three shifts of operators. During the first week of operation it was found necessary to adjust all protective relays so that settings would harmonize with system characteristics. Since that time no operators have been on duty, the only attendance on the station being the semi-weekly visits of the inspector.

A brief resume of the operation of the station under the stress of emergencies might be of interest. On several occasions during the early morning hours and on holidays when the system load was light and voltage conditions were such that the phase modifier was not needed it shut down and stayed off until an appreciable variation in voltage brought it back on the line. On a few occasions the unit has shut down due to failure of the line feeding the Vancouver substation and has started up again and brought the voltage back to normal as soon as the bus was re-energized. On several occasions, when it was necessary to take the 66-kv. line out of service, the unit held the voltage to normal with the total Vancouver load carried on the 11-kv. line from the Albina substation. On one occasion subsequent to the failure of a hydro generator the unit was under automatic control of the load-limiting device for several days. This meant that part of the time the unit was carrying load up to the full limit as determined by the load-limit setting,

heavy short circuit on the transmission line the unit shut down and locked out as it was supposed to do under extreme short-circuit conditions.

Operation of the station to date has been entirely satisfactory, and it is believed that the continuity of service factor will be higher with full-automatic control than with manual control.

### Heavy Carboys Easily Handled with Simple Cradle

A convenient means of handling the distilled water carboys used in servicing station storage batteries is shown



Carboy cradle and carboy carrying-handles which greatly facilitate the handling of these large containers whether they be filled with distilled water or acid.

in the illustration. Usually the carboy reposes upon the floor and it is only with difficulty that the water may be poured into a hand container. As shown here, however, the operators at the Newark substation of the Pacific Gas and Electric Company have rigged up a cradle out of scrap lumber.

In this particular instance the extra carboys are stored at quite a distance from the little room which houses the

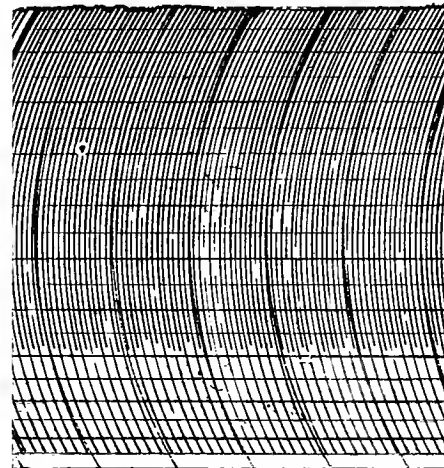
station battery. The job of carrying over a full container was a difficult and awkward task until the carrying handles seen leaning against the wall to the left of the cradle were hit upon. These carrying handles are shaped roughly from pieces of 2 x 3-in. lumber. The straps are arranged so that the handles may be slipped down under the cleat which surrounds the box and then given a quarter-turn winding up the straps and clamping the handles tightly against the box. In the illustration the cleat is hidden behind the upper rim of the cradle.

### Switch Operations Recorded by Graphic Meter

By M. J. Brooks, Consulting Electrical Engineer, San Francisco.

In a recent test held on some switches manufactured by the Pacific Electric Manufacturing Company of San Francisco the purchaser required the switches to be operated every thirty seconds continuously for 24 hours.

Although observers were stationed at the switches, on account of the fact that one failure to operate at any time during the test would mean an entirely new run, it was thought best to have a permanent record of the operations. An Esterline graphic wattmeter accordingly was connected in the line supplying power to the



Section of graphic wattmeter chart showing record of 30-sec. switch operations.

switch motors and a very satisfactory record of the operations thus obtained. The accompanying section of the chart shows each operation of the switches over a period of about 40 min. It will be noted that the opening of the switches may be distinguished from the closing, on account of less power being required to open.

At a lecture the speaker orated fervently:—He drove straight to his goal. He looked neither to the right nor to the left, but pressed forward moved by a definite purpose. Neither friend nor foe could delay him nor turn him from his course. With a masterly singleness of purpose and with eyes for only the far-away goal he forged on utterly oblivious to intervening obstacles. He, the mighty truck driver.

# Annunciator System Indicates Switch Operations

Service Restoration Greatly Expedited by System which Conveys Instant Information to Operator

By A. E. DAVIDSON, Engineering Department, Southern California Edison Company, Los Angeles

A dependable annunciator for various types of trouble is becoming more recognized as a necessity in the modern substation and power house. It

Because of its reliability and ruggedness, telephone equipment is used for this work.

Two types of these annunciators were built; one for large power houses where individual indications are required and another for use only in small substations where group-type annunciation is sufficient. Both work on the same principal, but only the smaller type will be described in this article.

It was designed with eight separate indicating positions. Experience has shown that the average small substation of this class on the Southern California Edison Company's system requires indications of the following conditions:

60-kv. oil circuit breakers, miscellaneous, water tank alarm, bearing alarm, 15-kv. oil circuit breakers, transformer temperature, no voltage alarm and station ground detector.

For each of these alarms a common gong, located at any convenient place, is sounded and individual lamps for each circuit are brought into operation.

Figure 1 shows a telephone-type box annunciator suitable for either desk or switchboard mounting. On the right side are mounted card holders

with celluloid windows and name plates for each position. In the center is a row of standard switchboard keys. On the left side is a standard lamp jack containing 20 lamp positions, only 15 of which are used. Inside the box and directly behind the card holders a thin metal mounting plate holds eight S-148 telephone-type relays and one type HG relay. With the exception of a maple mounting strip for the switchboard keys, the annunciator is made entirely of metal.

When regular switchboard mounting is desired the back is omitted and to the bottom of the box are fastened two hinges that hold it to the switchboard. On the top is welded a mounting clip through which is passed a bolt with a wing nut. All fittings and clip angles are arc-welded to the box leaving no rivet heads exposed on the outside. The box is made of office steel with all corners welded and rounded. It is finished with a dull, black, baked enamel similar to the familiar desk-stand telephone. When the apparatus is located on a desk a back is provided and a rubber pad is fastened to the bottom. The front plate also is made of office steel and is removable allowing ample room for adjusting the relays.

This annunciator is wired according to telephone practice, all of the internal wires being brought together in a hand-made form. Figure 2, which is a rear view of the box with the back

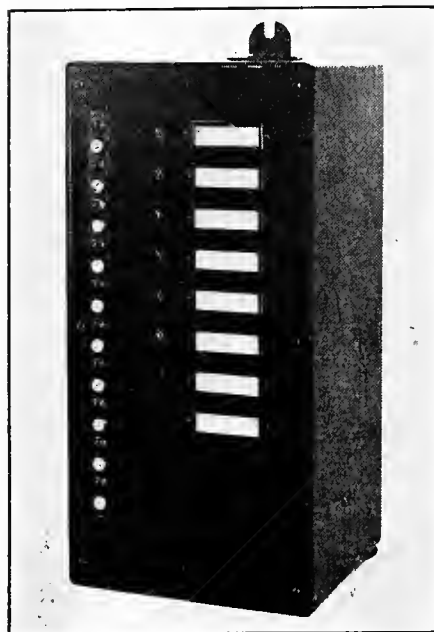


Fig. 1. Face view of telephone-type annunciator for small substations.

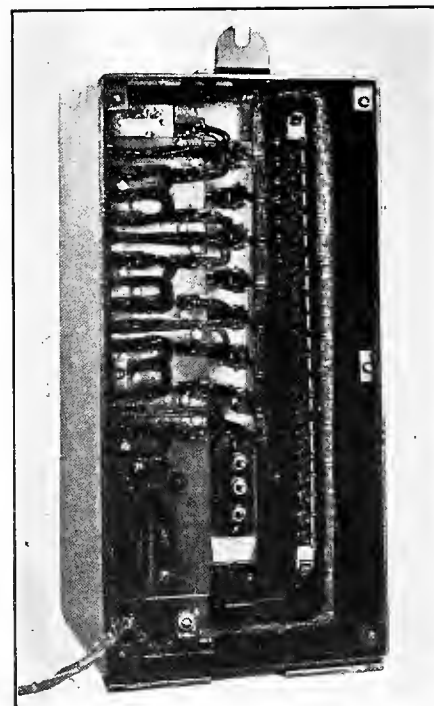


Fig. 2. Rear view of telephone-type annunciator for small substations.

generally is conceded that these signals should be both visual and audible. The visual signals show the individual indicators while the audible may be common for all annunciations. The desirability of centralizing all of these indications at one point led to the design of the apparatus herein described.

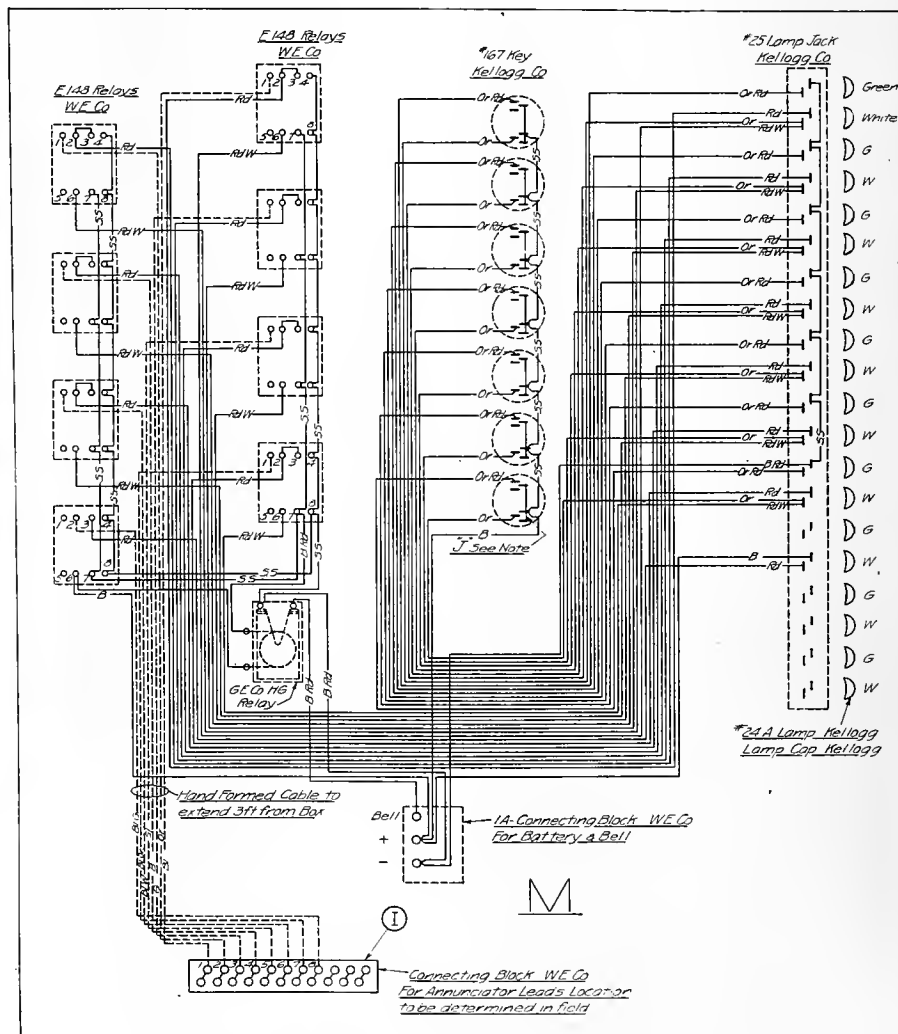


Fig. 3. Wiring diagram for annunciator shown in Figs. 1 and 2.

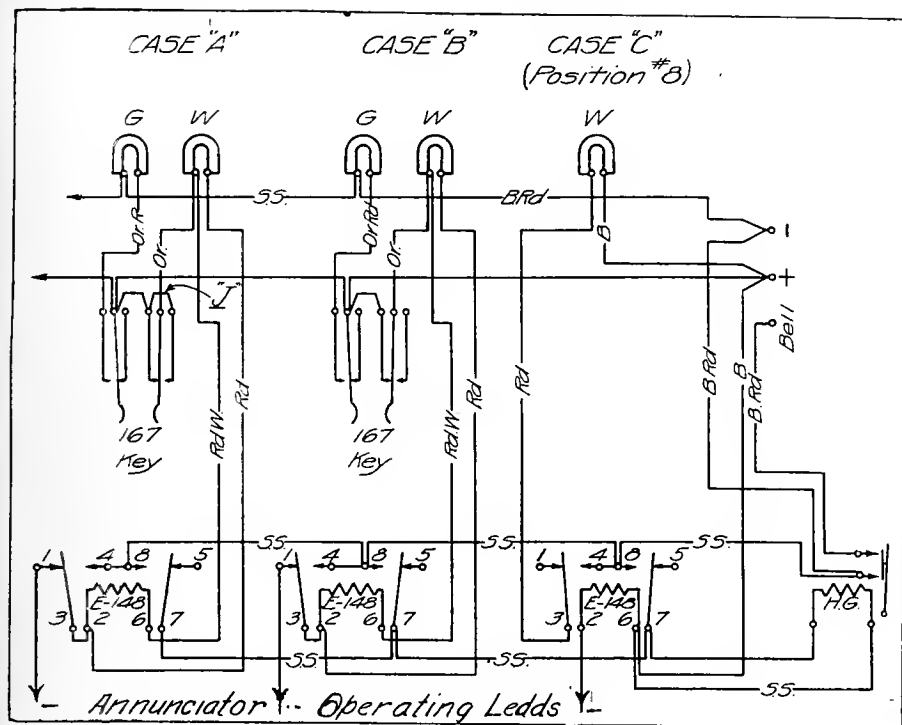


Fig. 4. Schematic diagram explaining operation of annunciator. (See text.) Case "A" is for momentary-contact operation. Case "B" is for continuous-contact operation. Case "C" is for ground detector. Circuits 1 to 7 wired as per case "A." When case "B" is desired, cut jumper "J."

removed, shows how this is done. On the right the form is directly in back of the lamp jack, the wires looping down to each lamp position. This form extends across the top and down behind the relays. The bottom end of this form is brought out of the box in a 3-ft. pigtail on the end of which is a terminal block. This pigtail is made up of the standard telephone-cable color code, i.e., blue, orange, green, brown, slate, etc.

The wiring diagram, Fig. 3, shows how simple it is to apply telephone practice and color code to this class of apparatus. Figure 4 is a schematic diagram illustrating the operation of the annunciator. Case "A" shows the circuit where a pallet switch used on oil circuit breakers has a momentary contact. The annunciator operating lead is connected to the E-148 relay. This telephone-type relay locks itself in, lights a white lamp, and operates the HG relay which rings the bell.

Since the contacts of the telephone-type relay are of limited carrying capacity the HG relay was added in order to make it possible to ring more than one bell. The operator then presses

the key opposite the white lamp burning. This restores the E-148 relay, releases the HG relay and bell and also lights a green lamp from a local circuit. The annunciator then is in a position to receive a second signal on the same circuit. This time the telephone-type relay operates the white lamp and bell the same as before, while the green lamp continues to burn until such time as the board is cleared.

The operation in case "B" is exactly the same as of case "A" except that the pallet switch has a continuous contact such as a bearing or transformer temperature alarm. When the key is pressed the green lamp is lighted, the bell and white lamp are cut off; but because of the continuous contact on the pallet switch no second signal may be received. Figure 3 of the diagram shows all key positions wired for momentary contact operation. When a continuous contact set-up is desired the change may be made quickly in the field by cutting the jumper "J." This removes the self-locking circuit of the telephone-type relay.

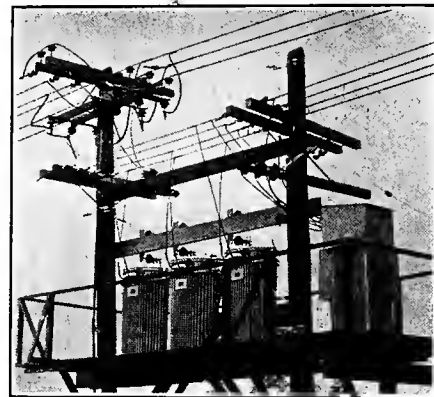
Case "C" or bottom position always is reserved for the ground detector be-

cause there is no key used in this circuit as shown in both diagrams and in Fig. 1. Only the bell and a white lamp are operated when the station ground detector closes a continuous-contact pallet switch. Both the bell and white lamp remain on until the operator opens a switch on the ground detector panel. Another instrument on this panel will continue to indicate the existence of ground until the same is cleared.

Figure 5 shows a cabinet-type annunciator used in larger stations and power houses where individual indications are required. This instrument is equipped with the same type lamp jacks, keys and telephone relays, the HG relay being mounted elsewhere on the switchboard. Operation is the same as described for the smaller type. This cabinet is suitable only for desk mounting because of its size. It is made of oak and finished to match the operator's desk.

### Pole-Top Distribution Station Serves Growing Area

The accompanying illustration indicates the substation construction employed at the National City and Chula Vista substations recently remodeled for 4-kv. operation. Primary supply is obtainable from either of two 11-kv.



National City 4-kv. pole-top substation of the San Diego Consolidated Gas & Electric Company; three transformers and one regulator. Energy may be taken from either of the two 11-kv. lines.

feeders, through Klauber repeating fuses. Due to the length of the 4-kv. feeders and to the residential character of the load, both of these stations are equipped with 3-phase, 4-kv. induction regulators mounted on stubs at one end of the substations.

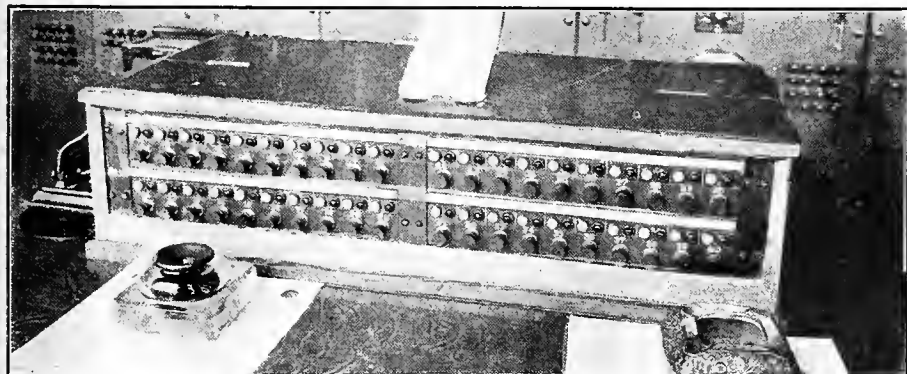


Fig. 5. Desk-type annunciator for larger stations; installed at Colton substation of the Southern California Edison Company



Line maintenance under difficulties. A crew working on a line on the Continental Divide at El. 12,050. Drift depth is indicated by the 35-ft. pole.

# IDEAS FOR THE CONTRACTOR

## Electrified Laundry Advertises with Illumination Brilliantly Lighted Building at Night Calls Attention to Peerless Laundry's Electrical Equipment

Located at the intersection of two much-traveled highways over which thousands of motorists pass every night, a laundry in Los Angeles, Calif., has utilized its location, enhanced by brilliant illumination, to sell itself to the public as a most up-to-date and

Slauson Avenue are struck by the sight of a large group of buildings, illuminated so well from within that every machine may be seen clearly, and externally by some floodlighting and unique color effects. Moreover, they are told by a number of large

3-hp., used as individual drive for the many laundry machines. But there are other motors, too, ranging up to 125-hp.

The laundry is equipped with its own generating plant, a result of the power shortage of a year or so ago. A 160-hp. natural gas engine operating a 150-hp. generator is installed. This is used to supply the lighting load at the present time. The generator is one made by the Electrical Machinery Company, and is a 150-kva., 900-r.p.m., 240-volt, 3-phase, 60-cycle unit. The output from this generator is transformed to 220/110-volt power for use throughout the plant.

In case of failure of the power supply, the board for power and light has on it a double-throw switch so that the power supply may be switched over to the city service. The city of Los Angeles Bureau of Power and Light supplies all of the power for operating the general motor load, the plant's own generator supplying only a small portion of motor load.

The control board shown in Fig. 1 is one of two similar boards controlling all flat-work washers. The contactors on this board automatically reverse each of the motors on the washers. Each of these two boards controls 40 machines. The boards are American panel boards, manufactured by the American Laundry Machinery Company.

The washers themselves are monel metal cascade washers. Each is equipped with individual drive, for which a start-and-stop button is provided at the washer.

To take the surplus water from the clothes after washing, Humatic extractors made by the same laundry machinery company are used. The clothes are placed in the extractor, which is started by pressing a button. Centrifugal action is utilized to extract the water, the extractor running the specified length of time and automatically stopping and opening up. Green and red signal lights above each unit indicate whether or not the machine is operating.



Fig. 1. One of two boards controlling flat-work washers. This board controls 40 machines. Contactors automatically reverse each of the motors on the washers.

modern institution. Nor is the mere advertising of this idea sufficient; the laundry itself bears out the thought in actual installation and mechanical and electrical refinements.

Passersby at night by thousands at the corner of South Main Street and

electric signs that the Peerless Laundry is located there. And from what may be seen through the windows it is further evident that the institution is electrified in every particular.

There are some 600 motors in use throughout the plant, most of them

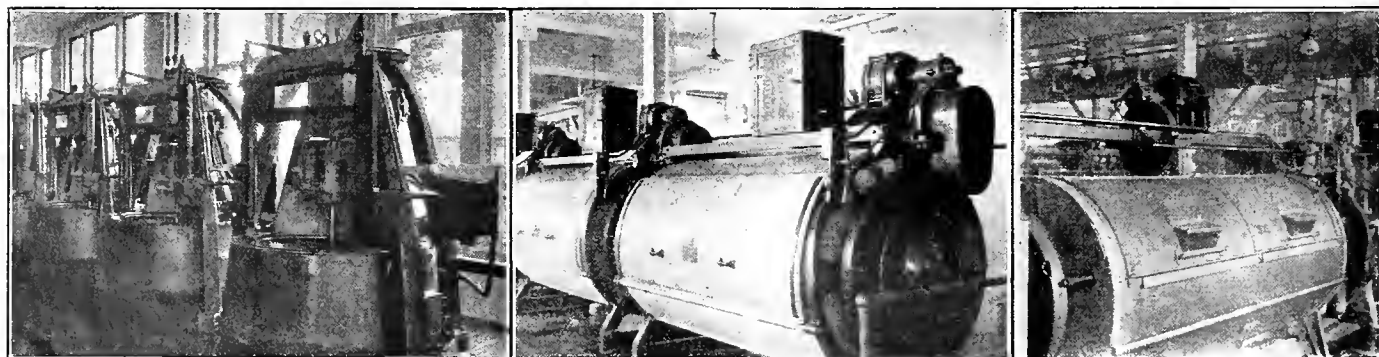


Fig. 2. A group of the extractors, showing the signal lights above each unit which denote whether or not it is in operation. Fig. 3. Two of the dry tumblers. The automatic reversing equipment for the motor operating them may be seen on the left of the motor. Fig. 4. Two of the washing machines, made of monel metal. The motors are operated from the control panel. The type of illuminating unit used in the building may be noted in this picture.





Fig. 6. The laundry as it appears at night from the main highways. There are four exterior electric signs used on the building. Fig. 7. Lighting on the exterior of the receiving and shipping departments. The large roof sign may be seen on the right.

Shaker tumblers are used to separate the clothes after they have been through the extractors. They are used on all flat work. Dry tumblers are used for all rough-dry clothes.

One of the features of the advertising illumination is the lighting of the

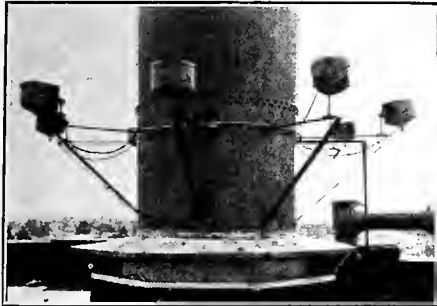


Fig. 5. The base of the stack and the floodlights used on it. One unit is directed on the steam emitted from the pipe on the right.

huge stack. The stack, more than a hundred feet high, is painted red. It is floodlighted by means of eight 500-watt X-Ray units and three 1,000-watt units manufactured by the Pyle National Company of Chicago. To add to the effect steam is ejected around the base of the stack and this is lighted by two red, one green and one amber lamp. When first installed these were all red floods, but the effect was so realistically like a fire that many people thought the building on fire and turned in alarms. A number of urns emitting steam are located at various places around the plant and illuminated also.

The entire plant is lighted every night until 11 p.m. The cost of this operation is charged to the advertising department as it is considered the finest kind of advertising. The plant is kept always spotlessly clean, a fact which is to be seen from the windows.

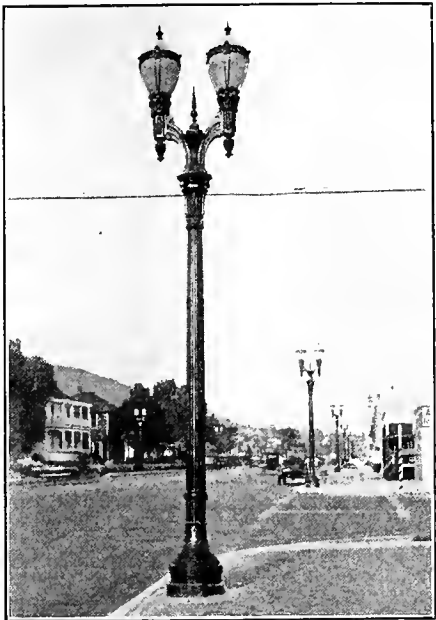
**Ventilating Fan in Vault Used in Glendale Light System**

A self-cooled motor fan operating in the transformer vaults of the electrolier system recently installed in the city of Glendale, Calif., has reduced temperature in these vaults 58 deg. This feature is but one of many in the installation made in Glendale on Colorado Boulevard between San Fernando Boulevard and Eagle Rock city limits by the Robertson Electric Company of Santa Ana.

Another feature of the installation is that it was wired with two circuits so that 83 units on the property side may be turned off at 10 p.m. and that all units on the property side may be turned off at midnight, one unit on each of the 83 standards on the street

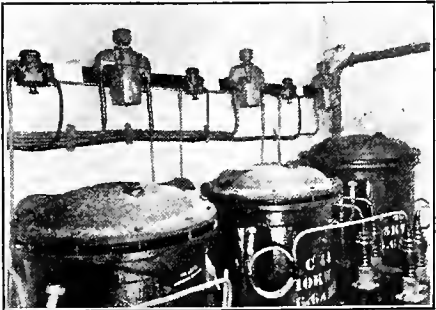
side remaining on all night. Alternate standards on the street intersections are burned with both units on all night.

The installation includes 157 two-light standards of a special Glendale design. They are cast-iron standards,



Electroliers of the recently installed system on Colorado Boulevard, Glendale, Calif. The street-side lamps burn all night, the property-side lamps until midnight.

reinforced by means of a 2½-in. welded steel pipe of extra strength embedded in the foundation. This is intended to prevent segments of the cast-iron standard from flying in case the posts



Inside a transformer vault on the Glendale lighting system. The transformers and oil cutouts are shown plainly.

are run into and demolished by automobiles. The average distance between standards is 146½ ft.

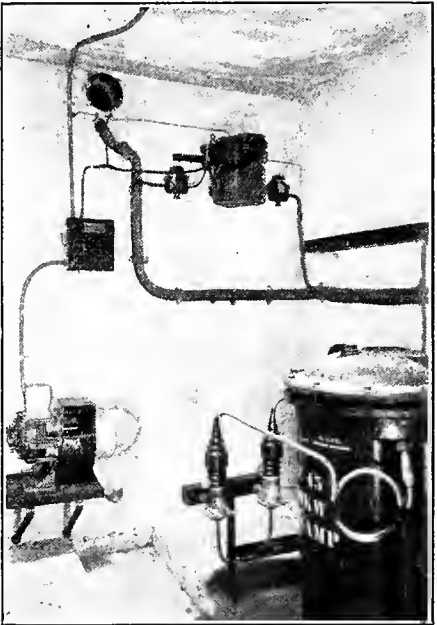
The lighting units are Westinghouse Electric & Manufacturing Company globes of rectilinear glass with opalescent cast, using a Paragon senior

top. Each unit is equipped with a Westinghouse 50-cycle auto transformer for 6.6 amp. with taps for 400 cp., 15-amp. and 600 cp., 20-amp. lamps. Lamps installed in the original installation are 400 cp.

Both the part-night and all-night cables are brought to a disconnecting pothead in the base of each standard. Conductor is No. 8 solid copper with 30 per cent Para rubber braided cover. The cable is No. 8 solid copper with 9/64-in. varnished cambric insulation and a lead sheath of 5/64 in. It is run in 1½ and 2-in. Sherarduct.

Power is brought into the primary side of the transformers, located in the transformer vaults, at 4,000 volts to ground. The transformers are General Electric Company subway transformers. Three vaults are used at intervals of approximately two blocks apart. D. & W. standard pole-type oil fuse cut-outs, fused for 1 amp. per kw. of transformer capacity, are installed in phase tap to the transformer. A General Electric porcelain cutout, based with solid copper, is installed in connections to neutral.

The transformer vaults are ventilated by means of an ½ hp. a.c. 11g self-cooled motor, operating a ventilating fan. A smaller transformer is used to supply power to the fan. Since installing the fan the temperature inside the vaults never has exceeded 100 deg., whereas before installation the temperature reached 158 deg. F.



The other end of a transformer vault on the Glendale lighting system, in which may be seen the ingenious ventilating fan arrangement and the small transformer used in stepping down current for the fan motor and lighting the vault.

## Questions and Answers on the Code and Safety Orders

Arrangements have been made with Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, to answer through the columns of the Journal of Electricity such questions on the National Electrical Code as are of general interest.

Similar arrangements have been made with George E. Kimball, electrical engineer of the Industrial Accident Commission of the State of California, to answer questions on the Electrical Safety Orders issued by the Commission.

While it is the object of this department to assist in a better understanding of the Code and the Safety Orders, replies given are not to be considered as official interpretations applying in all instances, as some of the rules permit of varying interpretations under different conditions. The questioner should be guided by the inspection department having jurisdiction.

All who are interested are invited to send in their inquiries regarding the National Electrical Code to Claude W. Mitchell, Board of Fire Underwriters of the Pacific, Merchants Exchange Building, San Francisco, Calif., or to the Editor, Journal of Electricity, 883 Mission Street, San Francisco. Questions on the Safety Orders should be sent to George E. Kimball, Industrial Accident Commission, State Building, Civic Center, San Francisco, or to the Editor.

**Q. 13.** To comply with Order 711-2(d), would it be necessary to fuse separately the control wires running to the push button if the control wires were protected only by the starting protection exceeding the Table A in 702-1(q)?

As an example, if a 3-hp., 220-volt, 3-phase motor were installed and operated by a remote-control switch having 25-amp. fuses used for starting protection and three No. 14 wires were used to the push button, would it be necessary to install an additional cut-out with 15-amp. fuses to cover the requirements of this order?

**A.** There are a number of factors which enter into this problem and it must be considered from several angles. Considering the most common classes of installations, as for example, polyphase motors operating at 220 or 440 volts, using automatic or auto-manual starting devices with remote-control switches, we would consider a control circuit as being protected if the branch circuit fuses for the motor were not larger than 45 amp. It is understood the wire in the control circuit will not be smaller than No. 14 whether fused or not. This, under ordinary circumstances, would permit control circuits to be installed without fuse protection, on motors not larger than 5 hp. operating at 220 volts or 10 hp. at 440 volts, other than that provided by the motor circuit overload protection. The problem would be more simple if it were only a question of protecting the conductors of the control circuit, but frequently the control buttons at "start" and "stop" stations develop trouble, and fuse protection may be necessary in all cases even though the control circuit switches may be located close to the motor control device. This department, however, will approve installations without fuses in the control circuit on polyphase motors operating at less than 600 volts regardless of the size of the motor, if the control buttons are installed as a part of the starting device or are located not more than 3 ft. from it. If later experience

proves that this method is hazardous, fuses will be required in the control circuits regardless of the location of the switches. Cartridge-type cutouts may be installed in a metal cabinet close to the starting device. The cover of the enclosure must be marked with the regulation warning, "Open switch before fusing." An individual switch is not required directly ahead of the fuses when they are installed at the motor-starting device, but the motor circuit switch must be marked plainly, identifying it with the circuit so that it may be located readily and opened to disconnect the starting device and control circuit fuses.

**Power Company Manager Takes Red Seal to His Home.**—P. D. Shepperd, manager, Fort Lupton Power & Light Company, Fort Lupton, Colo., doesn't believe the story about the shoemaker's children, and accordingly has so added to the electrical installation in his own home that it recently was approved according to the Red Seal specifications. Mr. Shepperd has done much to further the popularity of Red Seal homes in his community which is included in the territory served by the Electrical League of Colorado, Denver.

## Illuminated Greasing Rack at Fresno Service Station

For the convenience of the autoist who would have his car greased after sundown, a former employee of the San Joaquin Light & Power Corporation and his partner in establishing a service station in Fresno hit upon the novel plan to have the greasing pit will illuminated so that this work might be done as well at night as by day.

The Hazelwood Service Station, as it is known, located at 2941 Ventura Avenue, Fresno, employs a pit for greasing operations rather than an elevated platform or rack. The pit is 16 ft. long, 8 ft. wide and 6 ft. deep, and lined with concrete. A concrete curbing surrounds the pit opening, in which recesses have been provided for the installation of the lights. The car is run over the pit on two 18-in. I-beams 20 ft. long. These provide runways wide enough to accommodate dual-tired trucks.

If the greasing is to be done at night, a turn of the switch throws light under the car chassis from nine 100-watt lamps placed around the pit. Four of the lamps are placed above the curbing, at the corners of the pit, shielded by a wire guard. Four of the lamps are in recesses in the concrete curbing. Another light is directed on the car from above through the usual goose-neck arrangement. All wiring



Night-time greasing of automobiles or trucks is made possible at the Hazelwood Service Station, Fresno, by good illumination. These photos show the effect produced, and the units themselves by which the pit is illuminated, embedded in the concrete curbing surrounding the pit.

for the lights is run in conduit embedded in the concrete and controlled from the service station.

The service station illumination is the idea of "Blackie" Reithenburgh, former San Joaquin employee, and his partner, Shan Kilburn. Another refinement of service offered by these two is that once the name and address of a customer is secured, he is sent a postcard reminding him when his car should be re-greased.

## All-Electric Cafe Located on Highway Well Equipped

It would be expected that an all-electric cafe might thrive and flourish in a crowded metropolis, and indeed many an opportunity to sell complete electrical equipment for such an installation has been let go by if the location of the cafe was not in a crowded area. But also in Buelton, Calif., 30



A. Andersen, topped by his electric sign telling passersby that his is an electrical cafe through-out. The cafe is located in Buelton, Calif.

miles south of Santa Maria, A. Andersen has proved that an all-electric cafe is a success.

Andersen's Electrical Cafe, as it is known, is located on one of the chiefly traveled highways of the state. Its electric sign, placed attractively in full sight of all travelers, is an invitation to the traveling public to eat in a well equipped, clean, wholesome cafe, with food cooked well in the most modern manner by electrical equipment. Moreover, the invitation is followed up by just those very qualities in every detail.

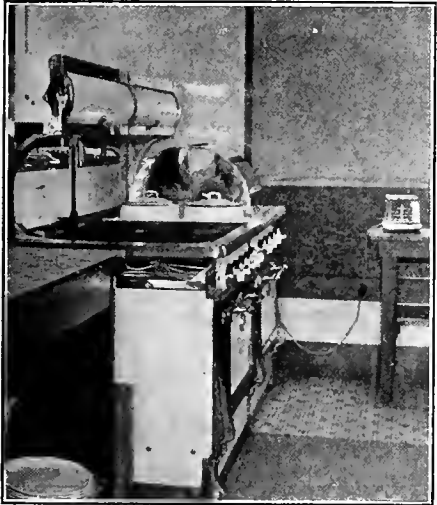
Included in the equipment of the cafe is a Standard combination range and steam table of 20.6-kw. capacity; a Hotpoint automatic water heater, 5-kw.; a Hotpoint fry griddle, 3-kw.; a Hot-



point hot plate, 3.8-kw.; a Hotpoint coffee urn heater, 1.1-kw.; and a Strite automatic toaster, 5.5-kw.

Mr. Andersen also runs a soda fountain in connection with the cafe, in which he has three refrigerator cabinets, all cooled from a central Frigid-air electric refrigeration unit.

Formerly known as Andersen's Cafe, Mr. Andersen decided to change his electric sign to Andersen's Electrical Cafe at the time he installed all the electrical equipment, so that the ad-



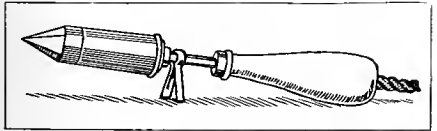
Inside Andersen's Electrical Cafe in Buelton, Calif., the combination electric range and steam table is placed in the window where all who pass may see.

vertising value of the installation might be used to attract the weary traveler in search of a first-class eating place. Mr. Andersen formerly was connected with the dining-room department of the Biltmore Hotel in Los Angeles, during the first seven months it was opened, and so appreciated the value of this fact from an advertising standpoint. He also formerly was connected with the Plaza Hotel in New York.

One feature of the installation is the location of the range in the front window of the cafe where it may be seen by all passersby, enticing in its cleanliness.

Cotter Pin Supplies Support for Soldering Iron

An ingenious shop "kink" was given all users of electric soldering irons recently by Donald McLean, of Cleveland, and should prove handy to many contractors in their shops here. It is an idea that is simplicity itself but is one of the handiest tricks ever brought to their attention. Furthermore it is a device that costs practically nothing



A cotter pin, cut off at the ends and slipped over the shank of an electric soldering iron, provides a safe and handy rest for it.

and not only adds to the general safety of the shop but also to its efficiency and practicability.

Mr. McLean took a large cotter pin and cut it off about one-half inch from

its end. He fitted it around an electric soldering iron between the handle and the point. This provides a good rest for the iron when laid aside or when heating up. It also permits keeping the point clean and lessens the chance of it falling off on the floor. In this way the man handling the electric soldering iron need not worry should he happen to leave the current on for fear that the iron might start a fire, and when he comes back to continue the job he need not go to the trouble of wiping off a lot of lint or other dirt which the iron has accumulated by falling on a work bench or on to a floor littered with droppings usually found around a shop.

Large Number of Lamps Used in Theater-Sign Installation

There are 8,538 lamps used in signs on the Metropolitan Theater in Los Angeles. Several of these are shown in the accompanying illustration. The roof sign has 14 letters, is 120 ft. long and contains 1,521 25-watt lamps. The vertical sign on the right (over the main entrance) is 54 ft. from top to bottom and contains 1,176 10-watt and 644 50-watt lamps, 10-watt lamps being used in the border and 50-watt lamps in the letters.



Electric signs on this theater contain 8,538 lamps totaling 183 kw.

The vertical sign on the left is 62½ ft. high and 5 ft. wide. It contains 1,268 10-watt lamps in the border and 550 50-watt lamps in the letters. In addition to the signs shown, there is a vertical sign over the Broadway entrance which is 62½ ft. high, containing 1,568 10-watt lamps in the border and 608 50-watt lamps in the letters. Various other signs on the marquee contain 698 25-watt lamps and 505 10-watt lamps. The total connected load of the signs is 183 kw. The entire installation was made by the Electrical Products Corporation of Los Angeles.

Question Box

Arrangements have been made to answer through the columns of the Journal of Electricity such questions on electrical construction and other subjects as are of general interest. Inquiries should be sent to the Editor, Journal of Electricity, 883 Mission Street, San Francisco.

Q. 1. What is the proper mixture of concrete to use in making a foundation for a motor?—J.T.R.

A. One part Portland cement, two parts clean, sharp sand and four parts or rock make a good mixture. Sand should be free from vegetable matter and rock should have all dirt washed from it before use.

Q. 14. Can you give a table showing amperes per horsepower, in relation to efficiency, of d.c. motors?—E.M.W.

Efficiency of Motor Volts	A.			
	75% Amp.	80% Amp.	85% Amp.	90% Amp.
At 110	9	8.4	7.9	7.5
At 220	2.5	4.2	3.95	3.75
At 500	1.98	1.86	1.75	1.66

Q. 3. Please give the data pertaining to standard plow steel hoisting rope of 1-in. diameter.—A.G.L.

A. Diam.=1 in. Cir.=3 in. Wt. per ft.=1½ lb. Strength in 2,000-lb. tons=38. Working load in 2,000-lb. tons=7.6. Diam. of drum or sheave to use=4 ft.

Q. 6. What is the formula for expressing reactance?—H.E.J.

A.  
Where:  $X = 2 \pi f L$   
 $X$  = reactance  
 $L$  = inductance (henrys)  
 $f$  = frequency (cycles)  
 $\pi = 3.1416$

# BETTER MERCHANDISING

## Glendale Electric Store Wins June-Bride Contest

Judges Find Difficulty in Selecting Winners from Fine Window-Display Photos Submitted in Competition

In one of the closest competitions on record the J. A. Newton Electric Company, of Glendale, Calif., won the first prize in the June-Bride window-display contest conducted by the California Electrical Bureau recently, it was announced by Victor W. Hartley, executive secretary. The Central Electric Company of Watsonville was a close second, and the McNally Company of Pasadena won third prize.

The prize winners and the amounts won in the contest are as follows:

1st. J. A. Newton Electric Company, Glendale .....	\$50
2nd. Central Electric Company, Watsonville .....	25
3rd. The McNally Company, Pasadena.....	20
4th. E. A. Kneip Electric Company, Lancaster .....	15
5th. Newbery Electric Corporation, Los Angeles .....	10
6th. Chamberlain Electric Company, Santa Paula .....	5

In addition to these, a special consolation prize of \$2.50 was given to the Foote Electric Company at Grass Valley in recognition of the closeness with which it pursued the prize winners.

Honorable mention was given to the following entries in the very close race:

Valley Electric Company, San Luis Obispo  
R. Barcroft & Sons, Inc., Merced  
Levy Electric Company, San Francisco  
Smith Electric Company, Glendale  
Merced Hardware Company, Merced  
Acme Electric Company, Bakersfield  
Fisher Electric Company, Chico  
Valley Electrical Supply Company, Fresno.

### Better Quality Noted This Year

"There were two outstanding features in the June-Bride campaign this year," said Mr. Hartley, in commenting upon the campaign. "First—the extensive use which was made of the poster, reports from the various power-company managers stating that at no time in the past has there been so nearly a 100 per cent appearance of June-Bride posters in windows as there was this year. Second—the quality of the window displays as evidenced by the photographs received and comments which have come in from the field."

The judges in the contest declared that it was with difficulty that they could arrive finally at a decision as to which were to be selected as the best and be awarded prizes. Representing unbiased judgment in the selection of the prize-winners were the three judges appointed by the bureau for the contest for they were the officers of the

San Francisco Chapter of the Window Display Managers' Association.

### Letters Report Fine Results

Nearly all contestants, in submitting their pictures for the contest, com-

### Prize Brings Happiness to Lancaster Dealer

The whole town of Lancaster, Calif., shares in the joy of Mr. and Mrs. E. A. Kneip, electrical dealers, who won the fourth prize in the June-Bride window-display contest sponsored by the California Electrical Bureau. Upon receipt of the prize Mr. and Mrs. Kneip wrote the following enthusiastic letter to Victor Hartley, executive secretary of the Bureau. It speaks for itself.

E. A. KNEIP  
Plumbing—Heating—Hardware—Electric  
Lancaster, California,  
Aug. 3, 1926

Calif. Electric Bureau,  
San Francisco, Calif.

My Dear Mr. Hartley: We are in receipt of the check you sent us (\$15) for the fourth prize in the window-display contest. My dear Mr. Hartley, you cannot guess how gratified we feel over this, of the appreciation of our effort. This small town of Lancaster has talked of it for a week and feels that you have recognized the town. Half of the people here have come in and personally congratulated us, and so we share our pleasure with you. The winning of a prize gives a great incentive to making greater efforts in the future. We have been requested to put the exhibit in the window again. We shall always play up the electric displays with the happy feeling that somebody, big and fine and unbiased, has paid attention to the smaller dealers. I am enclosing you a copy of the local paper. If you print the prize winners in any publication, will you please mail us one? I am already laying plans for another good window. Thanking you and with sincere appreciation,

Respectfully,

E. A. and MRS. MARIE KNEIP.

P.S.—Mr. Tudor, Edison manager here, made a copy of your letter and sent it to the main office, and a personal letter of thanks and congratulations.

mented upon the gratifying sales results achieved by the use of the windows during the campaign. One prize-winner, in an enthusiastic letter to the secretary of the Bureau printed elsewhere, declared that he has been asked by his townspeople to repeat the window display which won the prize so that they may view it again.

In commenting on his window, W. S. Hunter of the J. A. Newton Electric Company, winner of first prize, said that the object he sought was to avoid the use of a figure in his window, trying rather to give the impression of the breakfast room as the June Bride should find it upon her return from the honeymoon. She should find her breakfast table completely set up with electrical necessities," he wrote.

The winner of the second prize, the Central Electric Company of Watsonville, sent in colored photographs of the window to show color effects produced. A description of the window says: "The floor was covered with pink crepe with a border and trail of crepe rose leaves (pink). The bell consisted of white crepe rose leaves and hung suspended over the bride. The background near the bride consisted of ferns interwoven with roses."

### Strengthened Merchandising In New Policy Set-Up

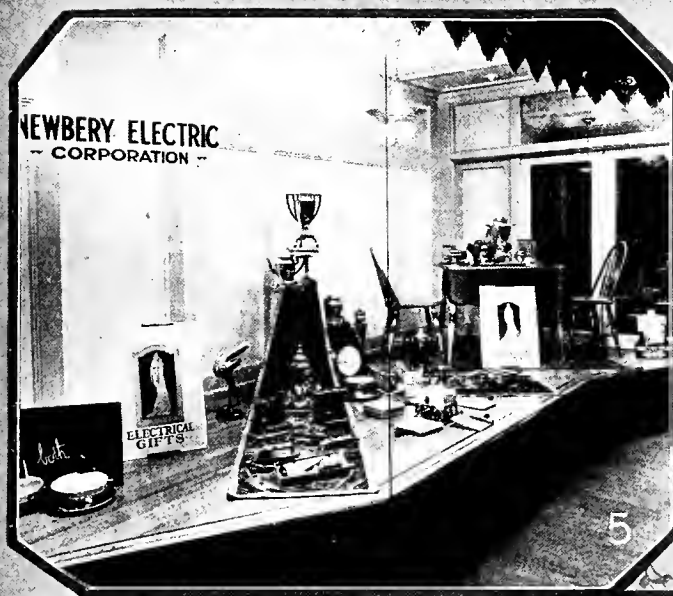
More intensified selling has resulted from changes in the merchandising organization of the B. C. Electric Railway Company, Vancouver. The electrical appliance selling has been placed in the hands of a committee of three: J. Priestman is in charge of the outside salesmen; W. E. Dawson is superintendent of the retail stores and stock; while T. C. Bosley is the third member of the committee, representing the vice-president's department. The committee works under the supervision of E. E. Walker, sales engineer.

The new committee resulted from the expanding sales efforts of the company which required a separation from the general light and power contract business. Mr. Priestman, formerly assistant to E. E. Walker, sales engineer, carried on new business activities as well as the direction of the salesmen.

The B. C. Electric Railway Company is at the same time expanding its chain of stores. Recently better premises have been obtained in New Westminster, and a new store has been opened at Chilliwack. The greatest move is to take place in 1927 as a result of the recent purchase of a prominent downtown location in Vancouver. A short time ago the company announced the purchase of a property at the corner of Dunsmuir and Granville Streets, 50 x 120 ft. in size, for \$275,000.

The present leases have until July 1, 1927, to run, and while the company's intentions have not been announced definitely, it is expected a modern store building for both electric and gas appliances will be erected on that site. This will be a great aid to merchandising as the company's main store in Vancouver at present is at the rear of its interurban station and in the wrong locality of the city.





**JUNE BRIDE WINDOWS** that won prizes in the recent contest conducted by the California Electrical Bureau are the windows pictured on this page. After a closely contested entry of photographs had been submitted to the judges, consisting of the officers of the San Francisco chapter of the Window Display Managers' Association, these were awarded the prizes: (1) The first prize window, won by the J. A. Newton Electric Company, Glendale, Calif. (2) Winner of the second prize, the Central Electric Company, Watsonville. (3) Third prize window, that of the McNally Company, Pasadena. (4) E. A. Kneip Electric Company, Lancaster, winner of the fourth prize. (5) The Newbery Electric Corporation, Los Angeles. This window took the fifth prize. (6) Sixth prize window, that of the Chamberlain Electric Company, Santa Paula.



# NEWS OF THE INDUSTRY

## "Housewives" Bill to Be Voted on in Oregon at November Election

Through a ruling of the supreme court of Oregon respecting the number of signatures required on initiative petitions to entitle them to a place on the ballot on the November election of this year, the so-called Hydroelectric Bill sponsored by the Housewives Council, Portland, will be voted on at that election. The opinion of the court, written by Justice Belt, reverses the opinion of the attorney-general, on which Secretary of State Kozer based his decision to deny the bill a place on the ballot. The court ruling was the outcome of mandamus proceedings brought against the secretary of state by the Housewives Council.

The controversy in the case grew out of interpretation of the law which states that the number of signatures on an initiative petition shall be equal to eight per cent of the votes cast for justice of the supreme court at the last general election. The situation was complicated this year by the fact that in the last election there were three candidates for supreme judge, two of whom were to be voted for. Attorney-General Van Winkle had contended that the proper basis of computation was to add the total vote received by all three candidates and divide by two to arrive at an estimation of the total number of voters voting for supreme judge. Eight per cent of this figure was 14,550, and because the "Housewives" petition bore the verified signatures of only 13,773 legal voters, its adequacy was denied. The opinion of the court interpreted the initiative law to mean, "Eight per cent of the greatest number of votes any candidate (for chief justice) received," and on this basis a sufficient number of signatures to an initiative petition would be 12,760.

Admitting its action to be arbitrary, the court, in its opinion, said: "Election laws should be liberally construed. The great constitutional privilege of a citizen should not be taken away by a narrow or technical con-

struction of a law regulating the exercise of such right." Further, it stated: "It is conceded that this construction is not free from criticism, but the basis selected will at least tend toward clarity and give operative effect to the law under consideration."

As is generally known, the Housewives Hydroelectric Bill would pave the way for the state to go into the power business, bonding it up to five per cent of its assessed valuation, or about \$50,000,000.

## Edison Company Builds 26-Mile Tie Line in One Month

A 26-mile tie line between the lower Kern River No. 1 hydroelectric plant, about 18 miles northeast of Bakersfield, Calif., and Vestal substation south of Porterville, was completed July 31, according to George C. Ward, vice-president in charge of construction and operation, Southern California Edison Company. Energy generated on the lower Kern River thus is made available to San Joaquin Valley consumers.

Late in June of this year it became apparent to the Edison company that steps must be taken to furnish an additional supply of 60-cycle energy to the San Joaquin Valley. All other Edison territory now is using 50 cycles. Realizing that the installation of additional frequency-changer capacity at Vestal substation could not be accomplished in time to help the situation this summer, plans immediately were made to construct a line which would make it possible to divert the energy generated in Kern River No. 1 plant at 60 cycles directly into the valley. To do this it was necessary to build six miles of line from the power plant to the right-of-way of the new 220-kv. Vincent transmission line now under construction, and to bring to immediate completion approximately twenty miles of this Vincent line, extending north to the intersection of this line and the line connecting the upper Kern

River plant near Kernville and Vestal substation. Experienced crews of line construction men from all parts of the Edison system were brought immediately into the valley to reinforce the regular maintenance crews of this territory, and on the first of July actual work was started. The line now is energized at 60 kv.

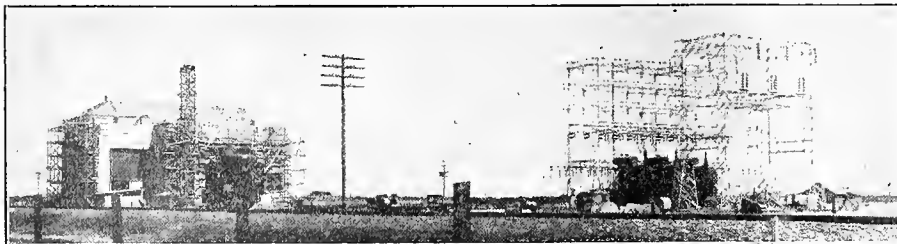
## Denver to Make Separate Issues of Franchise and Rates

After a period of practically five months the statistical work in connection with Denver's valuation of the Public Service Company of Colorado's property in that city and neighboring towns has about been completed. Indications are that the company's application for a franchise renewal will be placed before the people at a special election to be held early in October.

Ray E. Palmer, electrical engineer of New York City, in charge of the work, has been retained by the city in an advisory capacity and is expected to render his report by the middle of August.

September 21, one week after the city's fall primary election, was set tentatively as the date of the franchise election, it being the desire of both the executives of the company and of city officials to divorce it from the political element of the primaries. While it is still the intention to decide the issue apart from the primary election the mass of details has delayed the franchise election date.

The franchise will be covered separately from the rate question, although the two will be considered as a unit and one will not be adopted without the other. The franchise will cover only the questions of extensions, service, operation and such matters. Rates will be established by an ordinance as provided in the state constitution, and the rates to be set in the ordinance will be published in advance. Thus the ordinance will not be adopted unless authorized by the taxpayers by their favorable vote on the franchise. Commenting on this method of handling, the chairman of the councilmanic committee said: "We will cover the rate question separately from the franchise by municipal ordinances, although the two will be interlocking and one will not be adopted without the other. In this manner the franchise will cover only the questions of operation, service, extensions and similar questions. The rate-making ordinances will establish the rates. This method of control is that provided by the state constitution. By handling the situation in this way the right to change the rates at any time revision may be necessary will be reserved to the people. Then in later years if a change is found necessary, action may be taken either by vote of the people on an initiated ordinance or by the city council."



The Wilson substation of the Great Western Power Company of California near Merced, the terminus of the Brighton-Merced 220-kv. tie line, as it appeared July 29. The station was placed in operation July 6, but the building and certain parts of the equipment had not been completed. The entire substation is expected to be entirely finished early in September.

## New Quarters in Los Angeles Occupied by Pacific States Electric Company

The steady growth of the electrical industry on the Pacific Coast, in general, and of the Pacific States Electric Company, in particular, is emphasized by the rapid expansion of that company which has announced, almost simultaneously, its occupancy of new and larger quarters in Los Angeles and its preparations for a new and larger building in San Francisco.

The new location of the Los Angeles quarters is 385 East Second Street at Central Avenue where open house was held on Monday, Aug. 9. The new location is much more convenient for the wholesale trade for, while it is still in the downtown district, it is removed from the traffic congestion and is much more accessible than the former location at 236 South Los Angeles Street. Offices and warehouse



The new headquarters of the Pacific States Electric Company in Los Angeles.

occupy a five-story building. Stock rooms have been enlarged to meet the demands of the electrical contractors, and larger counter service has been installed. Greater office space tends to increase the efficiency of the entire organization. Frank J. Airey is Los Angeles district manager and C. H. Thrane district sales manager.

In San Francisco the company has entered into a long-time lease under which there will be built, according to its specifications, a three-story-and-basement, fireproof building at the southwest corner of Bryant and Tenth Streets, at an estimated cost of approximately \$500,000. It will have a frontage of 295 ft. on Bryant Street and 120 ft. on Tenth Street, with spur track facilities. The building, of the most modern type and equipment, will have a number of novel features in the design of stock rooms, counters, offices and similar equipment. San



Artist's drawing of the new building to be erected at Tenth and Bryant Streets in San Francisco for the Pacific States Electric Company.

Francisco being the headquarters of the Pacific States Electric Company, this new building will house not only the San Francisco district offices but also the office of D. E. Harris, president, H. R. Noack, vice-president, and S. B. Anderson, vice-president and treasurer, and the company's general organization.

The Pacific States Electric Company now is located at 575 Mission Street, but upon completion of the new building, which will be occupied exclusively by that company, the old quarters will be given up. F. C. Todt is the San Francisco district manager.

The changes announced are in line with the consistent policy of expansion followed by the Pacific States Electric Company which in 1925 opened new branches in San Diego and Long Beach, Calif., and in Phoenix, Ariz. During that year also the company moved into larger quarters, built to its specifications, in Oakland, and only recently has opened a complete new warehouse and offices in Spokane, Wash. This year the Portland offices were entirely remodeled and enlarged. In all, the Pacific States Electric Company now maintains nine district and branch offices.

### Citizens Vote to Sell Municipal Power Plant to Utility

The municipal electric light and power plant of the town of Green River, Utah, has been purchased by the Utah Power & Light Company. Sept. 1 is the date upon which the transfer becomes effective. A total of about 200 customers are served by this plant, which never has been a financial success under municipal ownership. The plant, which is located on the Green River about six miles north of the town, was built about twelve years ago.

As a result of the vote of the citizens on the question of selling the plant, forty-seven votes were cast in favor of the sale, with only three in opposition.

### California Properties Acquired by W. B. Foshay Company

Announcement has been made of the acquisition by the W. B. Foshay Company of Minneapolis, with offices in Portland, Ore., St. Paul, Chicago and New York City, of the Alturas Light & Power Company, the Fort Bragg Light & Power Company, and the Mendocino Light & Power Company, located in lumbering and dairying districts of northern California. These companies serve electricity at retail to the cities and towns of Fort Bragg, Mendocino, Alturas, Caspar, Little River, Albion, and wholesale to the town of Cedarville. The oldest company in the group began business twenty-two years ago. Electricity is obtained by generation at hydroelectric plants and through favorable long-time purchase contracts.

The three properties will be consolidated into a new California corporation to be known as the Peoples California Hydro Electric Corporation, which in turn will be controlled by the

Peoples Light & Power Corporation, a utility company owned and operated by the Foshay company, through which the latter controls its utilities. The Peoples Light & Power Corporation owns and operates utilities in Iowa, Minnesota, Wisconsin, Oregon, Washington, Vermont and Arizona, as well as California.

It has been the policy of the Foshay organization to retain the management and employees of all properties or companies taken over by them, insofar as it is possible. The company attributes much of its success to this policy as it maintains the important contact between the public and the company which makes for good will and keeps within the organization those who have been responsible for building up the business.

### Work Being Rushed on Chelan Power Development

Work is being rushed on The Washington Water Power Company's Chelan power project (Journal of Electricity, July 1, 1926, p. 30) where more than 600 men are working in three shifts in each 24 hours. On July 7 a total of 980 ft. of the main tunnel had been driven. Of this progress 290 ft. was at shaft No. 1, 100 ft. at shaft No. 2, 520 ft. at adit No. 1 and 70 ft. at adit No. 2. The tunnel at the two shafts is in loose gravel and must be timbered. The railroad spur, which connects with the Great Northern Railway line along the Columbia River, had been built about 2,200 ft. toward the power station site. The permanent bunk house to be used by The Washington Water Power Company's engineers was practically completed, and an inter-camp telephone system had been installed.

Contract for the generator and lighting arresters has been awarded to the General Electric Company, and the Westinghouse Electric & Manufacturing Company has received the contract for four transformers and necessary oil switches. The William Cramp & Sons Ship and Engine Building Company will supply turbine water wheels and accessories, and this equipment will be delivered early in 1927.

The first unit to be installed in the power station will be rated at 32,000 hp., and the ultimate installed capacity will be 128,000 hp.

### Late C. A. Luckenbach's Successor Named by Corporation

At the regular meeting of the board of directors of the Los Angeles Gas and Electric Corporation, held recently, the vacancies caused in the offices of third vice-president, treasurer and director by the recent death of C. A. Luckenbach were filled. W. E. Houghton, who for many years has been the comptroller of the company, was chosen as third vice-president and treasurer. In his new office Mr. Houghton will have charge of the general financing and accounting for the corporation.

H. L. Masser, gas engineer for the company, was elected to fill the vacancy on the board of directors. He will continue to serve the company in his present capacity as gas engineer. Mr. Masser was formerly on the engineering staff of the California Railroad Commission and is recognized as one of the foremost utility engineers in the country.

## Two Distribution Stations Put in Service by Utility

Two distribution substations recently placed in service by the Southern California Edison Company, Los Angeles, are the Monrovia and Howard substations.

The Monrovia station, which serves the cities of Monrovia and Arcadia and the surrounding territory, has a capacity of 3,000 kva. at 4 kv., with full automatic reclosing equipment on the 4-kv. feeders. It is fed by two 16-kv. circuits. Transformers and 16-kv. equipment are outdoors, while the 4-kv. regulators and the automatic reclosing equipment are housed in the building.

The Howard substation serves a section known as Athens south of Los Angeles. This is a station of the outdoor type with a capacity of 1,500 kva. at 4 kv. The steel structure and equipment for the incoming 16-kv. line, transformers and 4-kv. bus is permanent, and provision has been made for an additional 16-kv. line and for larger transformers when the need arises.

## Grain Company Loses Damage Suit Against Power Company

Decision in the suit brought by Balfour, Guthrie & Company, against the Great Western Power Company of California for \$619,000 has been rendered in favor of the power company. The suit was the outcome of a fire at Port Costa, Calif., in September, 1924, in which a quantity of grain, hay and feed belonging to Balfour, Guthrie & Company and stored in warehouses there was destroyed. The company sued on the grounds that the power company's transformers caused the fire. A previous trial resulted in disagreement of the jury.

In the trial just closed twelve weeks were consumed in the taking of evidence before the superior court in Oakland, Calif. Another suit in which Balfour, Guthrie & Company claimed \$224,000 for damages to buildings is still pending.

## Utility Equips Special Car for Radio Interference Work

In its efforts to combat radio interference the San Diego Consolidated Gas & Electric Company has fitted up a radio interference service car. It is equipped with all instruments necessary to the location of power interfer-



This car equipped with the necessary instruments is used by the San Diego Consolidated Gas & Electric Company in its radio interference service. Fred M. Pierce, standing beside the car, is the company's radio interference expert.

ence, including a portable superhetrodyne set, a two-tube receiver and a sledge hammer. The "super" is a six-tube portable Radiola (Model. 26) equipped with a filament voltmeter and milliammeter in the plate circuit of the

last tube. The two-tube set (detector and one stage of audio) operates on a 10-in. loop and is used after the "super" fails to give further accurate bearings. The sledge hammer is used to jar a pole suspected of being near the source of interference. If such is the case the disturbance will be noted in the receiver. Fred M. Pierce is the company's radio interference expert.

## Awarded Two Prizes for Saving Life of Companion

Two-fold recognition has been bestowed upon James G. White, employed as equipment sub-foreman by the Western Electric Company, Vancouver, Wash., for saving the life of Charles M. Benham. He has been awarded the American Red Cross first prize for first aid and the Vail medal, conferred by the American Telephone & Telegraph Company upon employees of the Bell system for acts of heroism.

Mr. White and Mr. Benham were installing a radio aerial on the roof of an apartment house at Vancouver when the lead wire, held by Mr. Benham, came in contact with a high-voltage circuit. Mr. Benham fell unconscious on the edge of the roof. Failing to remove the wire by means of a handkerchief and receiving a severe shock in the attempt, Mr. White obtained a broom from below, stood on the wet metal roof ledge and broke the contact. The injured man was so severely burned that both arms had to be amputated.

## Developed Water Power in U. S. Increased 11 Per Cent Since March, 1925

The amount of developed water power in the United States has increased about 11.5 per cent since March, 1925, according to the Department of the Interior, through the Geological Survey, which has just issued a report on the subject as of Jan. 1, 1926. This report shows that the capacity of water

## Refrigerator Company Increases Production Facilities

In order to take care of the increased demand for its products the Electric Refrigeration Corporation has found it necessary to increase its production facilities, and to that end has purchased a 35-acre tract of land in Detroit upon which a new factory will be built.

The first unit will be a reinforced concrete 3-story sprinkled factory building 440 x 640 ft. with approximately 600,000 sq.ft. of floor space. A 4-story administration building 200 x 55 ft. also will be built at the same time. Both buildings are to be completed and ready for occupancy Feb. 1, 1927. The total cost of land, buildings and equipment is estimated at \$5,000,000.

The manufacturing operations of the Kelvinator and Nizer divisions will be consolidated in this plant.

In addition to the new Detroit plant, an expenditure of \$1,500,000 has been authorized for the enlargement of the Leonard refrigerator factory at Grand Rapids, which will bring its annual production up to 500,000 ice cabinets.

Upon the completion of this building and enlargement program the Electric Refrigeration Corporation expects to have a yearly production capacity of 1,000,000 units, comprising household and commercial automatically operated electric refrigerating machines, both self-contained and separate, ice-cream cabinets, milk-cooling electric refrigerators and ice cabinets.

### Rank of the Ten Leading States in Developed Water Power for Different Years

STATES	1908		1921		1924		1925		1926	
	Rank	Per Cent of U. S. Total	Rank	Per Cent of U. S. Total	Rank	Per Cent of U. S. Total	Rank	Per Cent of U. S. Total	Rank	Per Cent of U. S. Total
New York.....	1	16.6	1	16.3	1	17.0	1	17.1	2	15.7
California .....	2	8.7	2	14.5	2	16.0	2	15.3	1	16.4
Maine .....	3	6.4	4	5.7	4	5.2	6	4.7	7	4.4
Pennsylvania .....	4	5.4								
Massachusetts ....	5	4.9	6	4.3	10	3.8	10	3.4		
Oregon .....	6	4.3								
Wisconsin .....	7	4.1	7	4.2	6	4.4	7	4.1	8	4.0
South Carolina....	8	3.9	8	4.2	8	3.9	5	5.1	6	4.6
Michigan .....	9	3.8								
New Hampshire.....	10	3.4								
Washington .....			3	5.7	3	5.3	3	5.6	3	5.9
Alabama .....									4	4.8
North Carolina....			9	4.2	5	4.7	4	5.3	5	4.8
Georgia .....			10	3.5	7	4.0	8	3.9	9	3.9
Montana .....			5	4.3	9	3.8	9	3.6	10	3.4
Total.....		61.5		66.9		68.1		68.1		67.9

wheels in plants of 100 hp. or more the first of this year was 11,176,596 hp., an increase of 1,138,941 hp., or about 11.5 per cent.

The total capacity in horsepower of water wheels in water-power plants in the United States for different years was as follows: 1908, 5,339,391; 1921,

hp. in water-power plants, and New York, with 1,750,391 hp., drops to second place.

The accompanying table, based on data published by the Geological Survey, shows for different years the rank of the ten states leading in developed water power.



## Well Known Electrical Man Forms Manufacturing Company

James R. Kearney, well known in the electrical industry, has announced the organization of The James R. Kearney Corporation, manufacturer of utility equipment. Operation will commence immediately at the company's plant, 4224-32 Clayton Avenue, St. Louis.

The formation of the new corporation comes after Mr. Kearney's many years of experience in the electrical industry. He first gained experience



JAMES R. KEARNEY

with the Topeka (Kansas) Edison Company as a groundman and lineman and rapidly was promoted to superintendent of line construction, engineer of construction and engineer of installing plants. Later he joined the W. N. Matthews Corporation, St. Louis, as salesman. He became a special representative, was placed in charge of sales west of the Mississippi, then in charge of sales west of Pittsburgh, and then in charge of sales in the United States. At the time of his resignation he was vice-president, a director and sales manager of electrical sales in the United States, Canada, Cuba and Mexico.

## New Lighting School Sponsored by Illuminating Engineers

A lighting school in which the sessions have been boiled down to five and which will cover the field presented in the former lighting schools conducted by the lighting committee of the Commercial Section, Pacific Coast Electrical Association, with other more recent data included, is to be put on during the week of Sept. 20 under the auspices of the Illuminating Engineering Society, San Francisco Bay Cities chapter. The school will be held in San Francisco and will be under the direction of Clark Baker, assistant manager, National Lamp Works, Oakland, president of that chapter of the I.E.S.

Mr. Baker was responsible for the former lighting schools and has arranged the course on this occasion so that it can be presented in fewer and more concentrated lessons.

The sessions will be divided as to evening and afternoon classes. Three of the classes will be held in the evening and two in the afternoon, providing a fifty-fifty division of time devoted to the study between employee and employer.

As in the former schools, a registration guarantee of \$10 will be required from each enrolled student, to be refunded at the rate of \$2 for each class attended. This may be advanced by either the employee attending the classes or by the employer who sends him to them.

A high grade of useful working information upon the very best practice in planning and figuring lighting installations is to be presented.

**Water and Power Act Has No Bearing on Boulder Canyon Dam.**—The proposed California Water and Power Act recently was denounced by the president of the Boulder Dam Association who stated that the act has no bearing whatever on the building of the Boulder Dam nor on any other proposed development of the Colorado River. The Boulder Dam Association is composed of representatives of civic and other organizations in Nevada, California and Arizona communities who favor the erection of a high dam at Boulder Canyon on the Colorado.

**Project in Alpine and Tuolumne Counties, Calif., Licensed.**—To Emma Rose, Anna G. Lane and Hobart Estate Company, of San Francisco, a license for twenty-five years for a project on Highland Creek in Tuolumne and Alpine Counties, Calif., partly within the Stanislaus National Forest, has been granted by the Federal Power Commission. A dam about 80 ft. in height will be built across Highland Creek, forming a reservoir of about 9,000 acre-ft. capacity, to be known as the Spicers Meadows Reservoir. This storage of water is necessary to provide for future growth in domestic and irrigation requirements and to augment the water supply to the applicants' existing power plants. The power proposed to be developed will be used in mining and public-utility service.

**Progress of Moffat Tunnel.**—Recent report of progress on the Moffat Tunnel gave the following figures: pioneer tunnel, east portal, 15,459 ft., west portal, 12,413 ft., leaving 4,511 ft. between the headings; main tunnel, east portal, 14,868 ft., west portal, 12,038 ft. The railroad tunnel has been enlarged to full size, 13,239 ft. at the eastern end and 6,760 ft. at the western end. The upset price of \$6,720,000 laid down by the Colorado legislature in 1922 as the cost of the tunnel has been exceeded through unforeseen difficulties in boring, and a \$3,500,000 loan recently was negotiated. This is the second supplemental loan, the first having been for \$2,500,000. Much of the added cost is chargeable to timbering required by the nature of the work encountered and by other normal developments of the work.

**Small Utility Sells to Pacific Gas and Electric Company.**—The Bell Electric Company, which has been selling and distributing electricity to retail consumers in the city of Auburn, Calif., and adjacent unincorporated territory, has been authorized by the California Railroad Commission to sell its property to the Pacific Gas and Electric Company. The rates charged by the Bell company will remain in effect pending a study of the situation by the commission's engineers.

## Contract Let for Three Largest Turbines Ever Built

The three largest hydraulic turbines in point of physical dimensions ever constructed will be furnished by the I. P. Morris department of The William Cramp & Sons Ship and Engine Building Company, Philadelphia, for the Philadelphia Electric Company's power development at Conowingo on the Susquehanna River. The contract recently let specifies three 54,000-hp. vertical-shaft turbines, which will operate at a speed of 81.8 r.p.m. under a head of 89 ft.

The water entering the turbine casing will pass through large valves of the butterfly or pivot type, the internal diameter of these valves and of the entrance to the turbine casing being 27 ft. The runners or rotating elements of the turbines will be of cast steel built in sections and will have an outside diameter of 17 ft. 9 in. Some idea of the size of these water-wheel units may be gained from the fact that the horizontal over-all distance across the plate steel casing will be 62 ft. and successive units will be spaced apart a distance of 72 ft. from the center of one unit to the center of the next.

## Company Reports Good Progress in Construction Program

The 1926 construction program of the Coast Valleys Gas & Electric Company, Salinas, Calif., is well under way. Included in the progress reported is the new Carmel substation which, together with practically all of the electrical installation, is complete but cannot be placed in service until new transformers are installed at Monterey. The new Monterey substation building is practically complete and ready for the electrical equipment. Both stations are to be equipped with automatic reclosing switches throughout.

Increased transformer capacity has been installed and placed in service at Moro Cojo, Hilltown and Gonzales stations, as have also new voltage regulators at King City.

Surveys are under way for the proposed second 55-kv. circuit from Soledad to King City which it is planned will be constructed this fall. The tap lines to loop the second 55-kv. line into the Salinas substation have been completed and put in service so that now the entire switching control of the company's transmission system centers in this station.

**Supply of Electricity in Japan Exceeds Demand.**—The supply of electricity in Japan steadily is becoming more than the demand, according to Denki-tomo. This situation is attributed to the fact that the shortage of power a few years ago caused the development of a large number of power projects, which now are about completed, while the present general industrial depression has resulted in a much smaller demand for power than was expected. In an attempt to remedy the situation the department of communications is said to have decided to take steps not to permit new applications for water-power development and also to order postponement for an indefinite period of those projects for which permits have been received but on which construction has not yet been started.

### Illinois Electric Company Opens Branch in San Diego

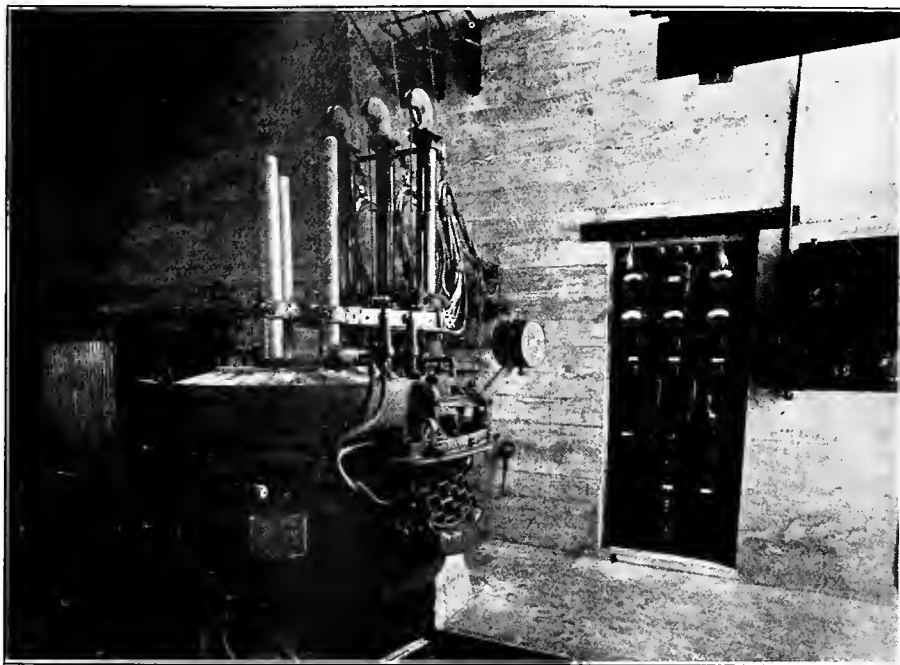
Following an established policy of better service to its customers, the Illinois Electric Company, Los Angeles, has opened a branch office at 712 Electric Building, San Diego, Calif. R. P. Wakeman, who has been associated with the Los Angeles branch for the past three years, will be in charge.

The territory covered by the new branch includes San Diego and Imperial Counties, together with adjacent territories in northern Mexico.

### Marked Activity Being Displayed in Industrial Heating

Electric furnaces aggregating approximately 4,000 kw. have been installed or ordered in the Pacific Coast states during the past sixty days, according to E. A. Wilcox, industrial heating engineer and representative for the Pittsburgh Electric Furnace Company and the Detroit Electric Furnace Company.

Chief among these installations is the 3-ton-per-hour 'Lectromelt furnace purchased by the Northwest Steel Rolling Mills, Inc., Seattle. This furnace will be used for melting scrap and turning out billet-sized ingots for rolling into merchant bars and concrete reinforcing rods. It has an output of 40 tons per day. The installation ag-

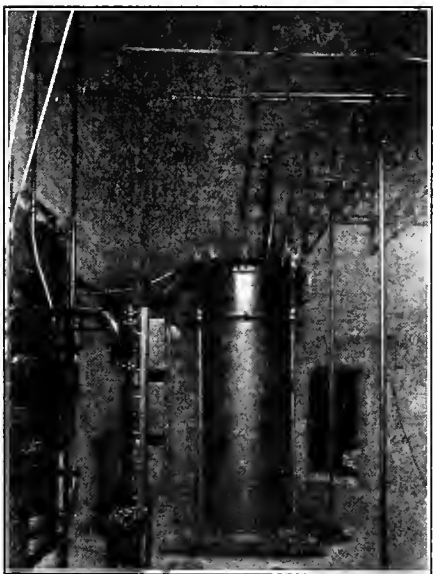


One-half-ton 'Lectromelt steel and iron furnace installed in George Bros. Foundry, Grass Valley, Calif.

Company, Los Angeles. This 100-kw. installation is served by the Bureau of Power and Light.

Two brass furnace installations shortly will be made on the lines of the Pacific Gas and Electric Company. A 350-lb. Detroit brass furnace has

been ordered by the Axford Art Bronze Manufacturing Company, San Jose, Calif. A furnace of the same type with a capacity of 250 lb. has been ordered also for the Mare Island Navy Yard. Each will have a capacity of 100 kw.



Transformer vault to serve electric furnace installed in George Bros. Foundry, Grass Valley, California.

gregates 1,500 kw. and is served by the lighting department of the City of Seattle.

A 1½-ton-per-hour 'Lectromelt steel and iron furnace recently has been placed in operation in the Warman Electrical Foundry, Los Angeles. This 800-kw. installation is served by the Southern California Edison Company.

George Bros. Foundry, Grass Valley, Calif., has installed a ½-ton steel and iron furnace for making castings for the mining field in that section of the state. The installation totals 300 kw. and is served by the Pacific Gas and Electric Company.

A Detroit brass furnace with a capacity of 350 lb. has been installed by the Price-Pfister Brass Manufacturing

## Northwest Electric Light & Power Association

### Personnel of Administrative Staff Announced by President

Receiving acceptances of his appointments of section chairmen and officers of the Northwest Electric Light & Power Association for the year 1926-1927, D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake, president of the association, has announced the completion of the administrative staff.

Section chairmen are as follows: Commercial—George C. Sawyer, sales manager, Pacific Power & Light Company, Portland; Public Relations—Richard M. Boykin, manager central district, Puget Sound Power & Light Company, Seattle; Technical—F. J. Rankin, chief engineer, Idaho Power Company, Boise; Accounting—W. L. Fitzpatrick, general auditor, Mountain States Power Company, Tacoma.

Members-at-large of the executive committee, as finally revised, are A. S. Moody, Northwest manager, General Electric Company, Portland, representing the manufacturers; J. I. Colwell, Northwest manager, Graybar Electric Company, Seattle, representing the jobbers; and A. C. McMicken, sales manager, Portland Electric Power Company, Portland, representing the utilities.

The complete personnel of the execu-

tive committee includes, beside the above-mentioned, the following officers present and past: D. C. Green, president; R. B. King, superintendent, Idaho Power Company, Boise, vice-president for Idaho; W. B. McDonald, manager, Mountain States Power Company, Kalispell, Mont., vice-president for Montana; George L. Myers, assistant to the president, Pacific Power & Light Company, Portland, vice-president for Oregon; P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake, vice-president for Utah; Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle, vice-president for Washington; and Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane, retiring president of the association.

The secretarial and financial affairs of the association will be in the hands of C. W. Lundquist, Utah Power & Light Company, Salt Lake City, secretary, and R. H. Jones, of the same company, treasurer.

Heading the general committee on rural electric service is Lewis A. McArthur, vice-president and general manager, Pacific Power & Light Company, Portland.

The first meeting of the executive committee for the current year was held at Portland, Aug. 9, 1926.

# A. I. E. E. News

## Interesting Program Planned for Pacific Coast Convention

Plans as outlined indicate that the Pacific Coast convention of the American Institute of Electrical Engineers to be held at Salt Lake City, Utah, Sept. 6-10, will be an exceedingly interesting and enjoyable meeting. The following program has been announced:

- Monday, Sept. 6.**
- 9:00 a.m. Registration at convention headquarters, lobby Hotel Utah.
  - 10:00 a.m. Session of counselors of student branches. Meeting of section officers of eighth and ninth geographical districts.
  - 12:00 m. Organ recital at Tabernacle.
  - 2:00 p.m. Opening session. Address of welcome. Response.
  - The Space Charge that Surrounds a Conductor in Corona, by H. J. Ryan and J. S. Carroll, Stanford University.
  - 110-kv. Transmission Line Construction of The Washington Water Power Company, by L. R. Gamble, Washington Water Power Company.
  - A New 220-kv. Transmission Line, by C. B. Carlson and H. Michener, Southern California Edison Company.
  - Effect of Unbalanced Tension in a Long-Span Transmission Line, by E. S. Healy and A. J. Wright, Electric Bond & Share Company.
  - 2:00 p.m. Ladies' drive about city and canyons.
  - 5:00 p.m. Excursion to Saltair—bathing, dinner and dancing.

- Tuesday, Sept. 7.**
- 10:00 a.m. The Circle Diagram of a Transmission Network, by F. E. Terman, Stanford University.
  - Calibration of Lichtenberg Figures, by K. B. McEachron, General Electric Company.
  - Fire Protection of A.C. Generators, by J. A. Johnson, Niagara Falls Power Company, and E. J. Burnham, General Electric Company.
  - Stability Characteristics of Alternators, by O. E. Shirley, General Electric Company.
  - Synchronizing Power in Synchronous Machines, by H. V. Putnam, Westinghouse Electric & Manufacturing Company.
  - 12:00 m. Ladies' luncheon at Country Club, followed by golf on picturesque links of the Country Club.
  - 2:00 p.m. Vacuum-Switching Experiments at California Institute of Technology, by R. W. Sorensen and H. E. Mendenhall, California Institute of Technology.
  - Economical Power Factor Correction, by S. H. Litchfield.
  - Electrical Practice in Lead-Silver Mines in Utah, by Leonard Wilson, Consulting Engineer.
  - Engineering Education—Its History and Prospects, by H. H. Henline, Stanford University.
  - 8:00 p.m. Informal reception, ballroom Hotel Utah, music and dancing.

- Wednesday, Sept. 8.**
- 10:00 a.m. Protection of Oil Tanks against Lightning, by F. W. Peek, Jr., General Electric Company.
  - Protecting Oil Tanks against Lightning, by E. R. Schaffer, Johns-Manville Company.
  - Variable Voltage Equipment for Electric Power Shovels, by R. W. McNeil, Westinghouse Electric & Manufacturing Company.
  - Mercury Vapor Power Rectifier, by C. A. Butcher, Westinghouse Electric & Manufacturing Company.

- Temperature of a Contact and Related Current-Interruption Problems, by Joseph Slepian, Westinghouse Electric & Manufacturing Company.
- 12:00 m. Ladies' excursion to Pinecrest Inn, at head of Emigration Canyon, for lunch.
- 2:00 p.m. Golf tournament on links of the Country Club.
- 6:30 p.m. Dinner, Hotel Utah ballroom, followed by: Presentation of Edison Medal Response by Dr. Ryan Presentation of golf trophies Music and dancing.

- Thursday, Sept. 9.**
- 10:00 a.m. Transcontinental Telephony, by O. B. Jacobs and H. H. Nance, American Telephone & Telegraph Company.
  - Controlling Insulation Difficulties in the Vicinity of Great Salt Lake, by B. F. Howard, Mountain States Telephone & Telegraph Company.
  - Carrier-Current Communication on Submarine Cables, by H. W. Hitchcock, Pacific Telephone & Telegraph Company.
  - 12:00 m. Trip by train to Bingham and Magna, visiting the famous mine and mill of the Utah Copper Company. Lunch will be served on train.

- Friday, Sept. 10.**
- 8:00 a.m. Excursion via automobile to Utah Power & Light Company's new 30,000-kw. hydro generating station at Cutler on lower Bear River.
- Saturday, Sept. 11.**
- 8:00 a.m. Excursion over celebrated Bear Lake-Bear River development of Utah Power & Light Company by automobile.

# P. C. E. A. News

## Engineering Section Announces First Group Meetings

The first group meetings of the Engineering Section of the Pacific Coast Electrical Association will be held in Los Angeles Sept. 1-3, in the Los Angeles Gas and Electric Corporation Building, 810 South Flower Street. The schedule of meetings, as announced by J. G. Rollow, chairman, follows:

COMMITTEE	Sept. 1	Sept. 2	Sept. 3
Accident Prevention .....	10 a.m.	9:30 a.m.	
Electrical Apparatus .....		9:30 a.m.	9:30 a.m.
Hydraulic Power.....	10 a.m.	9:30 a.m.	
Inductive Coordination .....			9:30 a.m.
Meters .....	10 a.m.	9:30 a.m.	
Overhead Systems .....	10 a.m.	9:30 a.m.	
Prime Movers.....	10 a.m.		
Safety Rules.....			9:30 a.m.
Underground Systems .....			9:30 a.m.
Executive .....	6 p.m.		4:00 p.m.
Luncheon (General) .....		12:15 p.m.	

Headquarters will be the Gates Hotel, Sixth and Figueroa Streets, where reservations should be made direct, with mention of the Pacific Coast Electrical Association.

**Purchasing and Stores Section to Meet.**—The first meeting of the Purchasing and Stores Section will be held in Los Angeles Thursday, Aug. 26, and Friday, Aug. 27. Sessions will be held in the Edison Building, 306 West Third Street, and will begin at 9 a.m.

# News Briefs

**Vernal, Utah, Has New Street-Lighting System.**—A street-lighting system in the business district of Vernal, Utah, recently has been installed by the Utah Power and Light Company. The new system consists of five 1,000-cp., four 400-cp. and thirty 100-cp. series incandescent lamps.

**Utility Applies for Permission to Issue \$10,000,000 in bonds.**—The Los Angeles Gas and Electric Corporation has made application to the state railroad commission for authority to issue \$10,000,000 of 5 per cent bonds, the proceeds of which will be used in the most part for the refunding of certain 6 per cent bonds now outstanding. The balance of the funds will be used for extensions and betterments to the system.

**West Kootenay Company Starts Work on Station.**—The West Kootenay Power & Light Company, Rossland, B. C., has started preliminary work in connection with the construction of another station on the Kootenay River at the point where the falls enter the Slocan pool. The heavy construction will be done at low water, in January and February, when several hundred men will be employed to rush the work through in the shortest time possible for such work.

**Working Upon New Vacuum Switch at California Institute of Technology.**—A new vacuum switch which eventually may do away with the necessity for the present type of oil immersion switch is being worked upon by Dr. Robert A. Millikan and Professor Royal W. Sorensen, of the California Institute of Technology, of Pasadena, Calif., working in conjunction with engineers of the Southern California Edison Company. The switch is said to be based upon the principles that a vacuum is a non-conductor of electricity. In recent tests the switch operated successfully with a load of 40,000 volts.

**Utility's Request for Permission to Require Uniform Deposit Refused by Commission.**—A recent request made by the Southern California Edison Company, Los Angeles, for permission to require from residence consumers not satisfactorily establishing credit a deposit of \$3.50, regardless of the size of residence, has been refused by the California Railroad Commission. The company previously had required from such consumers cash deposits ranging from \$1.50 for houses of four rooms or less to \$5 for eight or more rooms. Based on its findings that the average monthly bills of 60 per cent of the consumers making deposits did not exceed \$1.25 and that only 15 per cent exceeded \$2 a month, the commission refused the request. It further cited that the company may demand a deposit of twice the size of the average monthly bill before reconnecting service discontinued for non-payment of bills. The schedule of deposits was changed to \$2.50 for seven rooms or less and \$5 for eight rooms or more.



## News of the Electragists



### Program for State Convention at Del Monte Outlined by Joint Committees

With an excellent program already well lined up and arrangements for hotel and other accommodations practically completed, the state-wide meeting of California Electragists at Del Monte, Oct. 1-2, promises to surpass all previous conventions of Electragists in worth-while discussion of problems peculiar to the contractor-dealer field

in Monterey not far from Del Monte. At Hotel Del Monte special rates have been given as follows, all of which are American plan:

Single room, without bath—

1 person \$7.50 per day each  
2 persons, \$7.00 per day each

Double room, with bath—

1 person \$9.00 per day each  
2 persons \$8.50 per day each

Two single rooms, bath between—

2 persons \$9.00 per day each  
4 persons \$9.00 per day each

These special rates apply for one day previous to and one day after the convention so that those coming early or staying late may have the benefit of the special rates.



Host and hostess were they at the recent meeting of the California Electragists, Southern Division, in San Diego. J. ("Jess") F. Zwiener and Mrs. Zwiener were especially considerate of the visiting delegates and made them all feel at home.

as well as to provide an outing in which every feature of entertainment has been cared for.

The Electragists of the Southern Division already are planning on a special train caravan, it is reported, and the Northern Division, not to be outdone, is planning on several special features of its own. Special committees are working on these features in each division.

A registration fee of \$5 has been decided upon for the convention, the ladies being registered free this year. This should encourage Electragists to bring their wives to the convention, and indeed this is pretty generally the plan in the Southern Division in which the women folks have played an active part in many of its meetings in the past.

#### Rates at Hotel Announced

Arrangements for hotel accommodations also are being worked out in both divisions, the special rates given by the Hotel Del Monte having been announced recently. In each division cards or letters will be sent members by which they may make hotel reservations with hotel committees. These are expected to be in the mails shortly.

Although all arrangements are being made with Hotel Del Monte as to reservations, it is understood that for those who may prefer European plan accommodations, they will be available



Shows perfect co-operation with the fire underwriters, does C. P. Chetwood who, besides being electrical inspector, is city fire chief of Greeley, Colo. He is taking L. A. Varley, chief engineer of the Mountain States Inspection Bureau, whose headquarters are in Denver, on a tour of the city and showing him that no electrical fire hazards exist in Greeley.

While all details of the program have not been finally worked out, particularly with reference to the specific titles of the talks to be presented, the program in other respects is now complete. All major topics have been assigned and in most cases the names of the speakers and their general subject have been given. From the closely knit program as outlined it may be seen that there will be something doing every minute of the convention. The tentative program planned by the California Electragists for the convention is as follows:

#### Tentative Program

Friday, Oct. 1, 1926

Breakfast—Hotel Del Monte, 7:45 to 9 a.m.  
General session—All groups present—9:30 a.m. to 12 noon.

Opening remarks by H. H. Walker and remarks by C. Felix Butte, chairman of the Northern Division.

Report on the State Merchandising Section, prepared and presented jointly by "Kelly" Courtright and O. N. Robertson.

Report of State Estimating Section prepared and presented jointly by Earl Browne and a representative of the Southern Division Estimators' Section to be designated.

Report of State Motor Section prepared and presented jointly by Norman Nelson and Billy Hahn.

Report on special activities of Northern Division by George Eldridge.

Address by Charles T. Hutchinson, on the progress of the Red Seal plan.

Luncheon—12 to 1:30.

Afternoon session—2 to 5:30.

Closed meetings, Electragists only, of Merchandising Section, Estimating Section, Motor Section and Accounting Section.

Address—"Illumination Design for the Electragist," by Clark Baker.

Evening session—Joint meeting of division executive committees.

Saturday, Oct. 2.

Morning session—9:30.

Closed meeting for Electragists.

Golf for jobbers and manufacturers and other guests.

Election of officers.

Discussion on individual application of trade policy by Electragist membership.

Responsibility of Electragists to the industry. Leader to be designated.

Need for better business methods by individual members.

Local organization, by H. W. Barnes.

Open Forum.

Luncheon—12 to 1:30.

Afternoon session—2 to 5.

General meeting—All groups present.

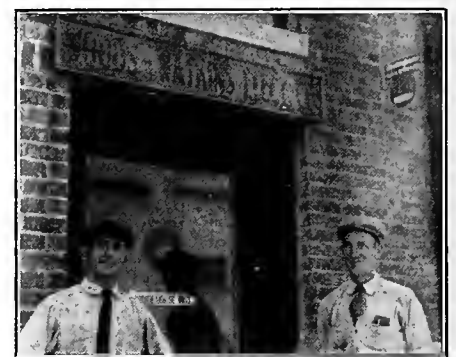
Address on Red Seal Plan by D. E. Harris followed by speaker as designated by Northern Division.

Short address on recent progress of contractor-dealer under lead of the Electragists, and increasing value of the organization to the industry, Glen Arbogast, Los Angeles.

Address by A. E. Wishon.

Closing address—Speaker to be designated.

Mathews Electric Shoppe is the new firm name of the business formerly operated under the name of Scott Electric Company, at 800 F Street, San Diego, Calif. Mr. Mathews was formerly superintendent of the firm and now has taken it over.



R. E. Woods and J. P. Watkins, in other words the Woods-Watkins Electric Company of Porterville, Calif. Placed end to end these two manage to reach all around the territory.

The first Red Seal home in the city of Santa Monica now is being erected and is located at 410 Fifteenth Street. Frank Airey, district manager of the Pacific States Electric Company, Los Angeles, is the proud owner. Frank further states that the job bears the "Check Seal" label and that the G. E. wiring system is being used. Dave Barry, Electragist, of the Globe Electric Company, Santa Monica, is the contractor in charge.



# Meetings

## San Diego Electric Club to Hold Annual Outing

The annual outing of the Electric Club of San Diego, Calif., will be held Aug. 22 in the form of a daylight boat trip to San Pedro. The S.S. Harvard will leave San Diego at 9 o'clock in the morning, arriving at 2 in the afternoon at San Pedro, where a one-hour stop will be made. Transferring to the S.S. Yale, the party will leave San Pedro at 3 p.m., arriving in San Diego at 8 p.m. Entertainment features, including concerts and dancing, will be provided on both north and south-bound trips.

All members of the electric industry in the vicinity of San Diego have been invited by the Electric Club to participate in the outing. C. D. Weiss of the San Diego Consolidated Gas and Electric Company is in charge of arrangements for this event.

**Annual Picnic Given by San Diego Utility Employees.**—The twelfth annual picnic of the San Diego Consolidated Gas & Electric Company's Employees Association was held at Mission Beach on July 11 with an estimated attendance of twenty-five hundred.

**Contra Costa League Elects Officers.**—At a recent meeting of the Contra Costa Electrical Development League held in Concord, Calif., W. S. Van Winkle, president and general manager of the Bay Point Light & Power Company, Bay Point, Calif., was elected president. Mr. Van Winkle is one of the charter members of the organization. Leo Kass was re-elected secretary. The new directors of the league are Jack Cummings, L. Stinchfield and J. McClelland.

**Public Service Company Entertains Co-operative Club.**—Members of the Co-operative Club and their wives, numbering 125 persons, were guests of the Public Service Company of Colorado at its Valmont plant near Boulder a short while ago. The guests, with R. G. Gentry, in charge of public relations for the company, as host, were conducted in automobiles to the plant where a picnic luncheon was served. An inspection of the power plant was followed by dancing. Open house at the plant and the encouragement of members of various organizations to make a tour of inspection is part of an educational plan of the company.

## Operating Department of Public Service Company Meets

The monthly meeting of the operating department of the Public Service Company of Colorado was held at its Valmont plant July 30. V. L. Board, general superintendent, presided over the meeting, which was devoted to consideration of budgeting problems and engineering reports of the various departments.

In attendance were Clare N. Stannard, vice-president and general manager; Charles A. Semrad, vice-president and commercial manager; Guy W. Faller, vice-president; Harry T. Hughes, treasurer, and the heads of operating departments in Denver. Managers of the Alamosa, Berthoud, Brighton, Leadville, Salida, Boulder, Sterling, Fort Collins, Idaho Springs, Windsor and

## COMING EVENTS

**Association of Electragists, International—**  
Annual Convention—Cedar Point-on-Lake-Erie, Sandusky, Ohio

Headquarters—The Breakers  
Aug. 24-27, 1926

**Purchasing and Stores Section, P.C.E.A.—**  
Meeting in Edison Building, Los Angeles, Aug. 26-27, 1926.

**Engineering Section, P.C.E.A.—**  
First Group Meetings Los Angeles, Calif.  
Los Angeles Gas & Electric Corporation Bldg.  
Sept. 1-3, 1926.

**Electrical Supply Jobbers Association, Pacific Division—**  
Annual Convention  
Empress Hotel, Victoria, B. C.  
Sept. 7-9, 1926

**American Institute Electrical Engineers—**  
Pacific Coast Convention, Salt Lake City, Utah  
Sept. 7-10, 1926

**Rocky Mountain Division, N.E.L.A.—**  
and  
**Colorado Public Service Association—**  
Joint Convention, Glenwood Springs, Colo.,  
Sept. 13-16, 1926

**California Electragists—**  
Annual State-wide Meeting—Hotel Del Monte  
Del Monte, Calif.  
Oct. 1-3, 1926

Lafayette districts were also present.

R. E. Burger of New York City, general manager of the public-utility division of Cities Service Company, was the principal speaker and dwelt on expansion programs being carried out by the Public Service Company of Colorado, the Ohio Public Service Company and the Toledo-Edison Company.

An inspection of the Valmont plant concluded the program.

# Book Reviews

## TRANSMISSION CIRCUITS FOR TELEPHONIC COMMUNICATION

By K. S. Johnson, member technical staff, Bell Telephone Laboratories, Inc. 326 pages, 209 illustrations, 2 tables, 7 appendices, 6 x 9 in., 1925. D. Van Nostrand, New York. \$5.

This book is an important addition to the small number of authorities available to the public on the subject of telephone communication. The book is designed as a text book on the subject and is limited to considerations of relative transmission efficiencies of various circuits and problems directly connected therewith. The author tells in a mathematical way the story of the development of communication circuits.

The chapter on Measures of Telephonic Efficiency makes clear the relations of the various terms used. The action of the transformer is taken up in an unusual manner and the treatment is quite involved. The discussion

is of great importance since it explains systems of loss comparison and measurement developed through half a century of research and experience. Formulas covering theoretical and practical circuits for substation instruments are worked out in detail.

Characteristics of power and telephone-transmission line problems are contrasted and methods developed for line computations. The theory and design of wave filters is treated in detail. Telephone repeaters, corrective networks, and superimposed circuits are dealt with in separate chapters. Carrier-current telephony is touched upon briefly. Six convenient appendices of mathematical formulas and a complete list of symbols follow the text.

The treatise is a valuable work for the engineer or the technical student, but is not designed for popular reading.

R.B.A.

## RELAY HANDBOOK

Prepared by the relay subcommittee of the electrical apparatus committee, Technical National Section, N.E.L.A., with the co-operation of the relay subcommittee of the protective devices committee, A.I.E.E. First edition, 1926. 1,001 pages, 749 illustrations, 55 tables, 4 1/2 x 6 1/2 in., pocket size. National Electric Light Association, N. Y. Price to N.E.L.A. members: 1 copy \$4, 10 copies \$3.75, 25 copies, \$3.50, 50 copies \$3.25, 100 copies \$3; to non-members 50 per cent higher.

Culminating five years' work on the part of a large staff of men, the Relay Handbook brings to the electrical industry the first comprehensive treatise upon that important subject. Operating experiences of most of the important power systems of the country are combined with descriptive and design data supplied by the manufacturers of that class of equipment.

The handbook presents a ready reference on the subject of protective relays, their design and operating characteristics and the fundamental concepts of their application. The text of the book is divided as follows:

Section	Subject	No. Pages
I	General Information.....	61
II	Detailed Descriptions of Relays.....	435
III	Tripping Mechanisms.....	47
IV	D.C. Systems Protection.....	39
V	A.C. System Protection.....	141
VI	Relay Transformers.....	59
VII	Testing, Maintenance, Records, etc.....	91
VIII	Short-Circuit Calculations.....	77
IX	Bibliography .....	13

The bibliography is divided under three heads: Relays, Instrument Transformers, and Calculations. These are carried back to 1912, 1908 and 1899, respectively. The book is well illustrated and typical cases are discussed frequently in amplification of the text.

G.R.H.

## HOW TO MAKE HIGH-PRESSURE TRANSFORMERS FOR RADIO

By Prof. E. E. Austin, E.E., Hanover, N. H.; 75 pages, 22 illustrations, 5 x 7 1/2 in. Published by the author. \$1.25.

This is another of the author's "how-to-make" books. It is designed for the non-technical electrical experimenter who desires to build high-tension transformers for radio transmission. An introduction is given to the terminology, symbols and simple calculations involved. Definite dimensions and information regarding materials and methods are covered for different sizes of transformers.

## Personals

J. A. McWilliams has been appointed field representative for the California Electrical Bureau, succeeding Frank J. Kiefer, resigned. For twelve years Mr. McWilliams was connected with The Washington Water Power Company, Spokane, and for five years of that time was one of the company's district managers. In 1922 he resigned from



J. A. McWILLIAMS

that position to go to California on account of his wife's health. They located in Fresno, and there he joined the organization of the Valley Electrical Supply Company as range specialist. Later he was made manager of range sales and then sales manager. Mr. McWilliams left the electrical industry to join the staff of the Metropolitan Life Insurance Company in San Francisco but now has returned to the fold.

J. J. Cooper, for twenty-two years associated with the Mountain Electric Company, Denver, has bought out the other interests and is now president. For the last six years Mr. Cooper has been managing head of the company.

J. C. Davidson, manager electrical department, Hendrie & Bolthoff Manufacturing & Supply Company, Denver, recently returned to that city after an extended business trip in the East, which included Camp Merchandise at Association Island and the General Electric Company's factory at Bridgeport, Conn.

Gano R. Baker, formerly affiliated with the industrial division of the San Francisco office of the Westinghouse Electric & Manufacturing Company, has resigned to become sales engineer for the Spencer Elevator Company in that city.

A. A. Blakesley, who has been connected with the Merced Irrigation District for a number of years, has been appointed chief engineer for the district. During the period of construction of the Exchequer Dam R. V. Meikle, who was chief engineer for the Turlock Irrigation District, served also in that capacity for the Merced Irrigation District. M. M. McIntyre, associated with the Merced project during the greater part of its construction, is to be operating superintendent of the Exchequer power house.

Robert B. Burrows, Pacific Coast manager, Sunbeam Lamp Division, National Electric Lamp Works, was a recent visitor in Denver.

C. W. Wiggins, superintendent of electric production, San Diego Consolidated Gas & Electric Company, has been appointed chairman of the prime movers committee, Pacific Coast Electrical Association.

Al C. Joy, director of publicity, San Joaquin Light & Power Corporation, Fresno, Calif., while in San Diego recently addressed both the San Diego Electric Club and the Advertising Club on "Keeping on Friendly Terms with 75,000 Customers."

A. E. Bacon, manufacturers' agent, and formerly associated with the Mine & Smelter Supply Company, Denver, a short while ago returned to that city from a business trip in the East.

H. G. Ufer, chief inspector for the Underwriters Laboratories, Chicago, lately attended a luncheon meeting of the San Francisco Electrical Development League as the guest of Claude W. Mitchell, of the Board of Fire Underwriters of the Pacific.

Harris E. Dexter of New York has been appointed chief of the electrical equipment division of the Department of Commerce. He succeeds R. A. Lundquist, who resigned recently to enter private employ. Mr. Dexter has had engineering and sales experience with the General Electric Company and the Boston Edison Company, and more recently has been manager of the Servel Corporation's commercial division.

G. R. Davidson, for six years connected with the publicity department of the B. C. Electric Railway Company, Ltd., Vancouver, recently resigned to enter the financial field. He has been succeeded by Walter S. Hudson.

Eugene Logan, for the past nineteen years connected with The Washington Water Power Company, Spokane, has resigned to engage in the general practice of civil engineering in that city. Mr. Logan had been identified with the company's engineering projects, including location of transmission lines and the preliminary surveys and reports on the Kettle Falls and Chelan projects.

E. H. Collins has been appointed acting assistant chief engineer for The Washington Water Power Company, Spokane. Richard McKay and L. R. Gamble have been named assistant electrical engineers for the same company.

E. E. Scofield, industrial engineer, The Washington Water Power Company, recently returned to Spokane from the East. While there he took a two weeks' course in industrial heating at Mansfield, Ohio, and in addition visited Detroit and Pittsburgh.

G. S. Covey, chairman of the Spokane Section, A.I.E.E., attended the recent annual convention of that organization at White Sulphur Springs, W. Va. While East he also visited Chicago, Washington, Atlantic City and Philadelphia.

R. A. Balzari, formerly manager of the industrial division of the San Francisco office of the Westinghouse Electric & Manufacturing Company, who resigned to accept a position on the counselors' staff of the McGraw-Hill Publishing Company, Inc., New York, has been appointed marketing counselor on the staff of that company's New York district.

E. F. Johnson, manager of the Pacific Gas and Electric Company's Colgate division, recently conducted a party of twenty business men of Marysville, Calif., and adjacent points in that division on a two-day inspection tour of the company's Pit River power plants.

G. H. P. Dellman, of the San Diego Diego Consolidated Gas & Electric Company, was a recent business visitor to Los Angeles.

R. W. Davenport, hydraulic engineer with the Federal Power Commission, was in Salt Lake City recently on an inspection tour for the purpose of familiarizing himself with power projects pending before the commission.

Walter D. Koch, New York and Boston specialty man for the Graybar Electric Company, recently spent several weeks in Denver assisting in the Graybar washer campaign being conducted by the Public Service Company of Colorado.

S. E. Gates, manager of the General Electric Company, Los Angeles, has returned from an extensive trip covering the eastern factories of that company.

C. P. Zimmerer of the auditing department, Electric Bond & Share Company, New York, spent several days in Salt Lake City a short while ago.

Allan G. Jones, assistant sales manager, General Electric Company, San Francisco, returned recently from the company's head offices in Schenectady, N. Y. While East Mr. Jones also attended the department conferences held by the company on Association Island.

D. C. Bertrand, formerly connected with the Great Western Power Company, San Francisco, has resigned to become affiliated with the Electric Equipment & Engineering Company, Aberdeen, Wash.

Frank J. Kiefer, for the past three years field representative for the California Electrical Bureau, has resigned from that organization to accept the



FRANK J. KIEFER

appointment of factory representative for The Armstrong Manufacturing Company, Huntington, W. Va., manufacturers of hardware and electrical specialties. Mr. Kiefer's headquarters will be in San Francisco. Prior to his association with the California Electrical Bureau Mr. Kiefer was connected with the Luthy Storage Battery Company in Hayward, Calif., for two years. For about ten years previous to that he was superintendent of construction for the Pacific Fire Extinguisher Company, San Francisco.

**M. Luckiesh**, director of the Lighting Research Laboratory, National Lamp Works of the General Electric Company, Nela Park, Cleveland, has had conferred upon him the honorary degree of doctor of science by Iowa State College.

**J. M. Perlewitz** of the Graybar Electric Company, visited Denver on a business trip a short while ago.

**E. K. Hartzell**, advertising manager of the western division, Public Service Company of Colorado, has been named chairman of the program committee for the eleventh district convention, International Advertising Association, to be held next February at Greeley, Colo. He is a former president of the Advertising Club of Boulder, Colo.

**C. M. McIntosh**, Denver representative of the MacBeth-Evans Glass Company, recently made a business trip to Texas.

**Clarence Hunt**, Pacific Coast representative of Robbins & Myers, was in Los Angeles in the interests of his company the first of the month.

**Robert M. Keeney**, industrial heating engineer, Connecticut Light & Power Company, Waterbury, Conn., was a recent Pacific Coast visitor.

**E. G. MacDonald**, assistant superintendent, Alameda Street station, Los Angeles Gas and Electric Corporation, Los Angeles, visited San Francisco not long ago.

**W. G. Murrin**, vice-president, B. C. Electric Railway Company, Ltd., Vancouver, recently returned from a three months' trip to England.

**W. E. Houghton**, for many years comptroller of the Los Angeles Gas and Electric Corporation, has been named third vice-president and treasurer of that company, succeeding the late C. A. Luckenbach.

**John H. N. Adams**, for three years director of publicity for the Chamber of Commerce, San Diego, Calif., recently resigned to become advertising manager of The Mountain States Power Company with headquarters at Tacoma,



JOHN H. N. ADAMS

Wash. While in San Diego Mr. Adams initiated and edited San Diego Business, a monthly magazine, and through his efforts more than 30,000 ft. of motion picture news reels were filmed there. Prior to taking up his residence in San Diego, Mr. Adams was with two of the larger motion picture organizations in New York, where he received his training and experience in promotional work. He is a native of New York City, and obtained his education in New Jersey schools.

**I. J. Kauffman**, general manager, Square D Company, Detroit, accompanied by Mrs. Kauffman, recently made a combined business and pleasure tour of the Pacific Coast.

**Ivan DeJongh**, of the Delco Light Company, Los Angeles, recently returned from an extensive eastern business trip.

**Ray W. Murphy**, Pacific Coast manager, Westinghouse Lamp Company, with headquarters in San Francisco, recently made a tour of the Northwest territory.

**J. P. Fairbank**, extension specialist in agricultural engineering, University of California, Davis, recently stopped for a brief time in San Francisco en route to the National Lamp Works of the General Electric Company at Nela Park, Cleveland. He was going to participate in the lighting course being given there and also to visit various farm equipment plants to learn what new applications may be used in rural electrification.

**L. M. Cargo**, district manager Westinghouse Electric & Manufacturing Company with headquarters in Denver, recently completed a two weeks' business trip in the territory about Salt Lake City.

**A. Emory Wishon**, vice-president and general manager, San Joaquin Light & Power Corporation, Fresno, paid a brief visit to San Francisco a short time ago.

**Victor W. Hartley**, secretary, California Electrical Bureau, San Francisco, while in Los Angeles a short time ago paid a visit to the Electric Club and approved its plan of holding club meetings during the summer.

**W. A. White**, New York, chairman of the board of directors, The Washington Water Power Company, recently had conferred upon him the honorary degree of doctor of letters by Princeton University. Mr. White has had a lifelong interest in literature and for more than forty years has been a collector of books.

**D. E. Harris**, president, Pacific States Electric Company, has returned from Bridgeport, Conn., and other Eastern cities where he conferred with officials of the General Electric Company in reference to the new building about to be erected in San Francisco for the former company.

**George A. Campbell**, general manager, Truckee River Power Company, Reno, Nev., not long ago made a trip to San Francisco.

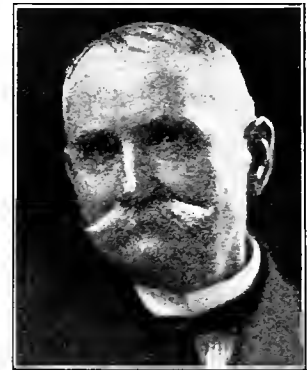
## Obituary

**Olaf Olson**, veteran tunnel builder, who had driven numerous tunnels in connection with hydroelectric power projects and irrigation developments throughout the Northwest, recently was killed by a fall through an open window. Mr. Olson drove the tunnel from Alouette to Stave Lake for the B. C. Electric Railway Company, Ltd.

**A. Wellington Hillis**, secretary and treasurer, Electrical Products Company, Detroit, died recently in that city. From 1905 until the beginning of the World War he was connected with the Western Electric Company.

**Frederick J. W. Luck**, for many years prominent in the engineering counsels of the Westinghouse Electric International Company in various countries, died in London, July 12. He was a fellow of the American Institute of Electrical Engineers.

**Charles Albert Coffin**, president of the General Electric Company from its organization until 1913 and chairman



CHARLES ALBERT COFFIN

of its board from then until his retirement in 1922, died July 14 at his home at Locust Valley, Long Island, N. Y., at the age of 81. He is credited with having done more to create and stabilize the electrical industry than any other man or group of men. A shoe manufacturer in Massachusetts prior to 1881, he purchased at that time, with others, the Thomson-Houston Electric Company, New Britain, Conn. He was active in the management of this pioneer electrical manufacturing company and extended the scope of its operations until finally he organized the Thomson-Houston International Electric Company to act as agent of the American company in foreign lands. In 1892 he succeeded in merging the Thomson-Houston company with the Edison General Electric Company into the General Electric Company, of which he became president. After his retirement from active work in the company, the directors of the General Electric Company, alluding to him as the inspiration and leader of that company for thirty years, established the Charles A. Coffin Foundation "as an expression of appreciation of Mr. Coffin's great work not only for the General Electric Company but also for the entire electrical industry. . . ." This is a fund of \$400,000, the income from which is used for "encouraging and rewarding service in the electrical field. . . ." Under this foundation a gold medal is awarded annually to the electric light and power company adjudged to have made the most distinguished contribution to the general advancement of the electrical industry during the year. Mr. Coffin distinguished himself during the war early in 1915, by organizing the War Relief Clearing House for France and her allies, which later was consolidated with the American Red Cross. He was active in the war work of the American Red Cross throughout the war and was decorated as an Officer of the Legion of Honor of France; made a Commander of the Order of Leopold II of Belgium; and elected to the Order of St. Sava, of Serbia. Mr. Coffin is survived by a widow and three children.

## TRADE NOTES

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., has changed its name and now will be known as the Leonard Refrigerator Company. The change follows the merger of the Kelvinator, Leonard and Nizer organizations. Henry W. Burritt has been elected president of the new company.

Barrett, Haentjens & Company, Hazleton, Pa., have issued a new 24-page booklet on automatic pumping. The subject is covered in detail and is illustrated by several drawings.

General Engineering & Supply Company, New York City, has developed a new machine which serves to mark bayonet bases for miniature and automobile lamps and simultaneously tests the bulb. It is foot-operated and capable of a production of 10,000 lamps per day. The machine is adapted to test single or double-contact lamps as well as double-circuit lamps as used in automobile headlights.

Curtis Lighting, Inc., Chicago, now has available a complete color equipment for its X-Ray reflectors, Nos. 400, 410, 500 and 510, known as "Jack," "Jill," "King" and "Queen." These color-ray units follow the same general shape as the rims of the reflectors. They may be used when the reflectors are recessed with X-Ray cast ceiling flanges as well as when they are attached to conduits or channels in the usual manner. The new color-ray is particularly adapted for show-window lighting and a variety of startling and beautiful effects now can be obtained easily, according to the company.

Schweitzer & Conrad, Inc., Chicago, has issued a folder descriptive and illustrative of its Pantograph air break switch. Many new, novel and valuable operating features, which are distinct improvements over all high-voltage switches, are claimed for the device.

The Absolute Contactor Company, Beloit, Wis., has let the contract for the construction of its new fireproof factory building at Elkhart, Ind. Greatly increased plant facilities will enable the company to take care of its rapidly expanding business.

Williams Gauge Company, Pittsburgh, has developed a new stream line pump valve, which it is claimed embodies all the features that are essential to maximum efficiency. It is exceedingly strong and sturdy, made along simple lines, having but four parts. To assure sensitivity it is made as light as possible so that its action is instantaneous and leakage troubles are eliminated.

General Electric Company, Schenectady, N. Y., describes and illustrates its various types of switchboards in its recent folder No. 135. Advantageous features are pointed out, and the photographs in the folder show minute details of design. Leaflet No. 399 describes a.c. switchboards with oil circuit breakers. These switchboards are applicable to small generating stations and substations in which it is desirable to keep the equipment cost as low as possible.

Pass & Seymour, Inc., Syracuse, N. Y., have placed on the market a thin type of canopy switch with an especially short body and narrow width. It is designed with parallel wires running straight from the switch body without bend or break. The wires are 6 in., No. 18 stranded new code wire, with a special cover that prevents defacing the walls during installation. The ends of the wires are stripped one inch for quick wiring.

Century Electric Company, St. Louis, has issued a folder on stator construction and field windings, squirrel-cage induction polyphase motors. Photographs of the motor and parts are given.



No, the long gentleman caught by the camera apparently peering hopefully into the depths of the large container is not a candidate for Mr. Volstead's wrath. He is Tom Wood, president of the Seattle Electric Club and winner of the Henry J. Martin Trophy in the club's annual golf tournament last year, and he is looking his last at the cup which this year he lost to J. J. Agutter. Note the now-look-what-you-went-and-done expression of Harry Martin, donor of the prize.

Killark Electric Manufacturing Company, St. Louis, has placed on the market a new bell-ringing transformer which is used as a cover for a 3-in. or 4-in. outlet box so that the primary wires may be brought to the transformer in conduit. It is known under the trade name of "Grey Bell" and is made for 110 volts, 60 cycles, and furnishes 8 volts on the secondary side for ringing door bells.

The Triumph Electric Corporation has been organized to take over the good will, design, records, patent rights and inventions of the Triumph Electric Company. The new company will specialize on its TR self-start automatic heavy-duty motor and at the same time be in a position to supply its other lines of electric and refrigerating products.

Standard Electric Stove Company, Toledo, Ohio, has produced a new urn heater under No. 3,000. It is made in two wattages, 1,000 and 1,500, each controlled by a three-heat switch. This heater is an addition to the company's line of complete electrically equipped coffee urns and immersion urn heaters shown in its catalog No. 15.

The Cutler-Hammer Manufacturing Company, Milwaukee, has produced a new device for the accurate measurement of gas flow. It is called the Cutler-Hammer Thomas meter and is made in sizes capable of measuring from 2,500 cu ft. up to 200,000 cu ft. per hour. It is extremely simple to wire, to operate and to maintain, the company claims.

Wholesale Electric Company, of San Francisco and Stockton, has announced its consolidation with the Stewart Electric Company of Los Angeles, whose business in the future will be operated under the name of the Wholesale Electric Company. A. R. Fierce is president of the concern, and E. A. Stewart will maintain active participation in the Los Angeles branch.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued a 23-page booklet dealing with electrical equipment for heating and ventilating systems. Nine full-page engravings depicting some of the country's leading hotels, department stores, clubs and office buildings wherein Westinghouse electrical heating has been installed are shown in the booklet. Photographs of the various types of motors also are shown.

The Quadrangle Corporation, New York City, now is marketing a tool called "Quadrangle" for cutting outlet holes in plaster and wood. This tool can be used with an electric drill or with a hand brace. When the electric drill is used, a clean-cut hole is cut in less than a minute. With a hand brace it requires about three minutes. The cutting is done by four saws made especially for this tool. For plaster walls the holes are so arranged that screws inserted in two of the three holes provided are bound to catch the laths.

The Timken Roller Bearing Company, Canton, Ohio, is contemplating spending \$1,500,000 in expanding the Canton plant of the company. Building plans have been completed and the new units are to be finished by Jan. 1, 1927. At present the company claims to have the largest output of electric furnace steel in the world.

Ingersoll-Rand Company, New York, has issued a 21-page booklet on marine oil engines for direct and electric drive. Full-page photographs showing installations in the engine rooms are given in the booklet as well as actual photographs featuring the single-acting, direct-injection, 4-cycle engine for direct-connected and electric-driven motorships. Copies of the booklet can be had by addressing the company.

The Kuhlman Electric Company, Bay City, Mich., has established a factory office in the General Motors Building, Detroit, Mich. Richard P. Johnson will have charge of the office.

Economy Fuse & Manufacturing Company, Chicago, has issued a small folder containing price lists and descriptions of its renewable fuses. Western Electric Company are distributors for this fuse in the principal cities in the United States.



# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

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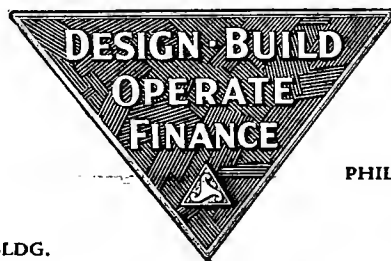
It is our opinion that you will get the best engineering service that is available in this country, that the work will be done within the estimate they furnish you, and that they will produce a structure which will be definitely permanent and durable.”

\*Part of a letter from a Stone & Webster client to a prospective client

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# EDITORIAL

## San Joaquin-Great Western Tie-Line Means Much to Industry

SATURDAY, August 14, marked another milestone in the progress of the electrical industry of California for on that day the Wilson substation as the southern terminus of the 220-kv. tie-line connecting the systems of the Great Western Power Company and the San Joaquin Light & Power Corporation was dedicated with appropriate ceremonies. With the completion of the line one of the greatest steps forward in the electrical development of the state has become a reality. Not only does the line interconnect the systems of two of the largest operating companies on the Pacific Coast but it provides ample facilities for the interchange of large blocks of power between any of the utilities from the Mexican border to southern Oregon.

With its extensive hydroelectric development and widespread transmission systems California was one of the first states to realize the common advantages of interconnection between its power systems. In periods of emergency such as have been occasioned by extreme drought or by breakdown or by increase of demand beyond the capacity of an individual company to serve, system tie-ins have made possible the interchange of moderate blocks of power from one end of the state to the other. Because of their emergency nature these interconnections have been somewhat limited as to capacity. The new tie-line, however, can be regarded as the first real link in a transportation system bus for power interchange that will meet most future demands.

H. P. Wilson, the man who projected the line and after whom the substation was named, describes its significance in the following statement:

"Primarily we are providing for California growth. We are also keeping in line with modern electrical development, which seeks constantly for economies and improved service which may benefit the consumer. The tying together of these two systems will make it possible for us to store water in Lake Almanor which would otherwise go to waste. When this water is coming into Lake Almanor the Great Western will depend for much of its power upon the San Joaquin supply. When Lake Almanor is full the San Joaquin reservoirs may be low, and then the process will be reversed and San Joaquin will be supplied substantially from the Great Western system. This conservation of water resources will mean economical power production the year around. It will obviate the necessity of continuous operation of steam plants and thus effect a big saving in both natural gas and oil, which are used

as fuel. It will postpone for a time too the necessity of increased plant capacity and will also make it possible to effect additional economies when such plants are built, as a plant can be built on one system which will adequately take care of the growth of two systems.

"The tie line places the standby service of each system at the disposal of the other. It also establishes an effective insurance factor in the operation of both systems in case of a heavy breakdown that might put a power plant or a transmission line out of business. Obviously this conservation of floodwaters and the use of generating and transmitting facilities in common reduces the amount of investment in such facilities on both systems as against what each would have had to invest otherwise. Ultimately this will mean a reduction of cost of service to the consumer."

While it was built primarily to bring about an improved load factor over the two systems and to effect a happy combination between the peak demands of industry in the territory of the Great Western and agriculture in the territory of the San Joaquin, it has a significance that transcends the mere physical interconnection between the two systems. Only the future will show what part it will play in the power development of the state as a whole.

## When "Profits" Are Really Losses

FOLLOWING the issuance of the annual report of Financial Transactions for California Municipalities and Counties, issued by Ray L. Riley, State Controller, for the year 1925, certain newspaper advocates of government ownership of public utilities seem to derive a great deal of satisfaction from data published therein with particular reference to the operation of electric light plants. According to editorial comment in the newspapers that may be classed under this category, the gross revenue from twenty-two municipal electric light and power plants in California, quoting from Mr. Riley's report, is placed at \$12,986,080.33; the total expenses at \$9,320,000.18. What could be more simple therefore than to deduct the latter amount from the former and show a clear profit of \$3,666,080.15, which according to the newspaper reports indicates a net profit no less than 28.3 per cent. An altogether delightful state of affairs, if true.

A scrutiny of Mr. Riley's report, however, and an attempt to reconcile these figures with what Mr. Riley actually does say is an interesting example of the misleading qualities of half truths. The re-

port discloses that in addition to the \$9,000,000 and some odd dollars set forth as total expenses, there is another item shown on page 112, table 11, entitled "Outlay," amounting to \$1,878,506.29. Whatever "Outlay" may mean, it certainly cannot mean "Income," therefore if one is justified in including this item with the other items of expenses the "Profit" before depreciation becomes \$1,787,573.86.

A further scrutiny of Mr. Riley's report discloses no allowance for depreciation whatever. Even municipally owned and government owned plants depreciate just as do those under private ownership and management. If a fair allowance for depreciation may be taken at 5 per cent this item alone amounts in the aggregate to \$2,269,139.45 on a valuation given by Mr. Riley at \$45,382,788.95.

It would look to the casual observer as though the operation of these plants according to accepted accounting methods is actually in the red, so to speak, about half a million dollars instead of showing a profit of 28 per cent. Again, the electric light and power companies pay in taxes about ten cents on every dollar of gross income they receive, that is  $7\frac{1}{2}$  per cent of their gross income for state tax, 2 per cent for their franchise tax, and federal tax amounting to about  $\frac{1}{2}$  of 1 per cent more on the gross income. So it seems that viewed dispassionately these twenty-two plants in the aggregate have lost about half a million dollars and in addition to this loss the state of California and the counties in which these plants operate have lost in taxes a million and a quarter dollars more which they would have received had the selfsame plants been privately owned and operated.

### Electragists Are Backing Up Their Trade Policy

HAVING laid down a trade policy for their industry, the Association of Electragists International is exerting every effort to see that this policy is lived up to, not only by members of that organization but by the entire electrical industry. Briefly this policy maintains that the most economic and efficient method of distribution of electrical products is from manufacturer through jobber to the contractor and dealer and thence to the consumer.

Knowing that conditions are hindering a complete realization of this policy one of the committees of the Electragists is making a series of economic studies in the hope that a solution will be forthcoming. The latest survey issued under the title, "The Balance Sheet of Distribution of Electrical Products," purports to show the distribution of the total output of electrical products in this country. Total manufacturers' production for 1923 is shown to be \$1,398,058,686. Obviously the contractor-dealer is not interested in exports or in the products absorbed by commercial telegraph and telephone companies, central station generating and transmission equipment, electric railway supplies and apparatus, broadcasting and commercial wireless equipment and materials and supplies sold to other manufacturers for incorporation into their products. Subtracting the total in these classes leaves electrical products to the value of \$476,097.961 in which

the contractor-dealer is vitally interested. Of this amount only \$212,500,000 passes through the contractor-dealers' hands. It is the balance that is worrying the Electragists. The survey shows that manufacturers are selling directly to consumers or to non-electrical outlets products valued at \$152,500,000. Similarly, jobbers are by-passing the contractor-dealer with products valued at some \$111,000,000.

Two types of competition are responsible for the fact that the electrical contractor-dealer absorbs only 45 per cent of the products in the group in which he is interested. The report classes as legitimate competition properly conducted central station merchandising, non-electrical and specialty stores and radio dealers. Illegitimate competition includes sales made by jobbers and manufacturers direct to consumers.

Admitting that there is no method by which their trade policy can be forced on the other branches of the industry, the Electragists are appealing for unselfish, broad-minded, fair and intelligent co-operation. In this they are correct. Only through careful study of their own problems and an interchange of thought with other branches of the industry will they gain the confidence and respect that is the foundation of fair dealing.

### Hoover on Development of Water Resources

SOME measure of hope for the ultimate solution of the many problems which are standing in the way of speedy development of some of the major Western waterways was held out by Secretary of Commerce Hoover in his recent address before the Columbia River Basin League at Seattle. Speaking on "A National Policy in Development of Water Resources" Secretary Hoover cited as reasons for the determination of definite national policies the growing interstate friction, local litigation, political obstruction and even international friction.

No one will deny but that the West has its share of quarrels with respect to water. State jealousies have almost precluded early development of the Colorado River. There are few court calendars which are not clear of legal fights between irrigation districts. Municipalities, power companies and riparian land owners all have their clashes over water rights. The situation presents a mixture of litigation, emotion and even politics.

Secretary Hoover's suggested solution to the present muddle calls for the establishment of commissions with jurisdiction over each drainage area similar to the Lower Mississippi River Commission which has brought peace, finance, construction, flood-control and navigation where ten years ago there was nothing but trouble. Such commissions would be made up of representatives of the states and the federal government, together with independent technical members. The task of these commissions would be to "consider the engineering data, to think, to plan, to devise, advise, co-ordinate, negotiate, persuade and set upon the obstreperous." Major lines of policy would be outlined, financial



support organized and recommendations made as to who should undertake projects.

Such a program seems simple enough on paper but it will require pressure if the legislation to initiate it is to be forthcoming. If the electric light and power industry can see in this suggested program a solution to some of its problems then Secretary Hoover and those others who are responsible for its initiation should be so informed.

## Rural Rates

### Must be Simple

SOMEONE recently made the statement that not even a Philadelphia lawyer could satisfactorily explain some of the rural rates which have been devised as a result of the attention which has been and is being devoted to the subject of rural electrification. Judging from the form of some of the schedules one of the chief fundamentals of rate making has been entirely overlooked, namely the need for simplicity.

Because California has been eminently successful in rural electrification over a period of development beginning in 1898, the schedules in effect in that state should serve as a helpful guide to those who are just now attacking the problem. On another page of this issue is the first of a series of two articles by a man who is not only familiar with the practices of the utilities but who has the interests of the farmer at heart. His comments on rates and rate schedules should be of exceeding value to the industry. One of the points on which he lays greatest stress is the need for simplicity. If his articles do no more than bring this thought home forcefully they will have been well worth while.

## The Utility Company and Local Affairs

JUST how much should a utility company mingle in local affairs? Is not the utility an inseparable part of the life of the community and as such necessarily interested in all that takes place within it? These are questions to which much thought may be given, questions which have worried many executives in the past. Yet the answer to them may be reasoned from the fundamentals of fair play quite simply and unmistakably.

With the trend of utility management toward centralization and consolidation the question becomes of more than passing importance. In the old days when every little community had its individual plant and local power company there was small doubt as to the extent to which the power company should enter into community activity. Every stray political wind blew danger to the stability and continuity of such enterprise. For that reason each small company fortified itself with those men whose claim was that they could so manipulate local politics that no demagogue might wipe the company from the field.

It was from this period that many utilities earned an undeservedly shady name. More often than not they asked only to be let alone to pursue their busi-

ness in a businesslike way, unharassed by political bellwethers who threatened their extinction. Thus antagonized they fell prey to another lot of political "strategists" who promised immunity at so much per immunization.

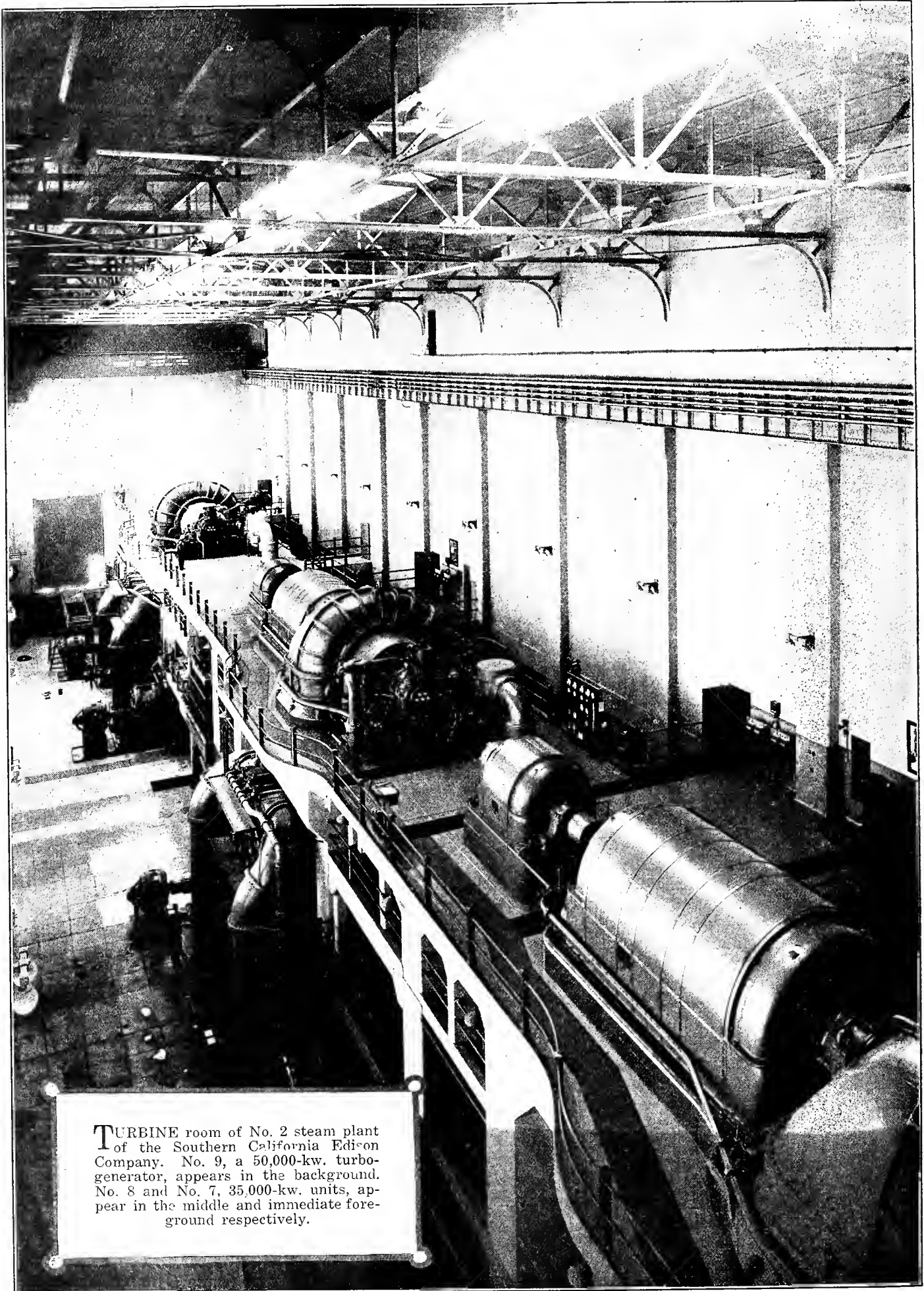
Consolidations and interconnections have removed the company, in many instances, from local interest in local affairs. The present tendency is one which would find its ultimate destination at the opposite swing of the pendulum. Yet this tendency toward complete divorce from the local scene is likewise unsound. While the local people dislike political interference they like only slightly less a complete indifference to their fate or fortune. They do not like to be completely ignored, even in their political troubles, and they do demand unmistakably that the utility company share in the non-political responsibilities which each business institution in the community should feel in local welfare.

Here, then, is the modus for participation in the local affairs of any given community. Let that participation be wholehearted and sincere in the furthering of any enterprise which works for the upbuilding of each community served. In some cases the utility company is asked to take the initiative in movements of public character which strive for a better community life. These are opportunities which no wise executive misses for in each of them is a potential mine of genuine good will.

It might be stated as an axiom, almost, that the utility which finally earns for itself by such public works the entire respect of each community it serves need fear little from the political misanthropes who would court favor by denunciations or legislation detrimental to that utility company. And thus, as a natural consequence of this particular type of participation in local affairs should come freedom from the necessity for that older and discredited type of participation in local politics.

## Overcoming Insulator Rifle Practice

POWER-LINE insulators and road signs are the favorite targets of the army of hunters which each year at this time take to the field in pursuit of the wily buck. Rifle practice seems essential not only to the small boy with his pet .22 but to the more mature hunter as well. Each year serious damage is done in all of the Western states through the practice of shooting at insulators on transmission lines. Heavy loss and serious inconvenience to those sections dependent upon the lines for service is the result. As a result of overtures from the light and power industry in Michigan, the pamphlet containing the game laws of that state now carries the following warning: "Never shoot at an electric power line. An insulator damaged by a bullet menaces life and property, causes fires and interrupts service upon which thousands depend." Undoubtedly a similar warning would be printed with the fish and game laws of every state if the power interests were to call the matter to the attention of the respective Fish and Game Commissions.



**T**URBINE room of No. 2 steam plant of the Southern California Edison Company. No. 9, a 50,000-kw. turbo-generator, appears in the background. No. 8 and No. 7, 35,000-kw. units, appear in the middle and immediate foreground respectively.

# Addition of Ninth Unit to Long Beach Steam Plant---I

## Electrical Equipment

By G. A. Fleming

Electrical Engineer, Department of Engineering Design, Southern California Edison Company, Los Angeles

ON July 13 load was first thrown on unit No. 9, the new 50,000-kw. turbo-generator in the Long Beach Steam Plant of the Southern California Edison Company. This brings the total plant capacity to 205,000 kw., 34 per cent in the six units of the older section known as Plant No. 1, and 66 per cent in the three units of Plant No. 2. The first two units of the latter were installed in 1924.

(Journal of Electricity, March 15, 1925, p. 199.)

The new generator is rated at 55,556 kva., 3-phase, 11-kv., 50-cycle, 90 per cent power factor, 1,500 r.p.m., and was built by the General Electric Company. It is star-connected and solidly grounded through an oil circuit breaker. On the same shaft is mounted a 4,000-kva., 2.3-kv., 3-phase, 70-per-cent-power-factor generator for station auxiliary power. Fig. 1 is a single line wiring diagram of the entire Long Beach station including both plants 1 and 2. Connections for the new unit are shown at the left.

An efficiency of 97.5 per cent has been guaranteed

**A** 205,000-hp. steam-electric generating station on the Pacific Coast would have been considered a wild dream but a few years ago. Now such a plant is in operation on the system of the Southern California Edison Company. Some of the novel features of the recent 50,000-kw. addition to the plant are covered in two articles.

for the generator at full load. This with the high efficiencies of both the turbine and the boilers will produce an over-all efficiency of 24 per cent. It is expected that this figure will be maintained quite closely under operating conditions and that 430 kw-hr. may be expected per barrel of fuel oil. This is slightly better than for the two previous large units and 70 per cent better than is obtained from Plant No.

1, built 15 years ago. When it is considered that the investment per kw. capacity in Plant No. 2 has not been increased over that of Plant No. 1, and that operating costs are materially less, it is not hard to realize the change in economic relation that has taken place in the past few years between steam and hydraulic power production.

The unit has been liberally designed and the operation to date justifies the belief that it will be capable of producing power in excess of its rating. On the basis of Units 7 and 8 being able to carry continuous overloads in the amount of 28

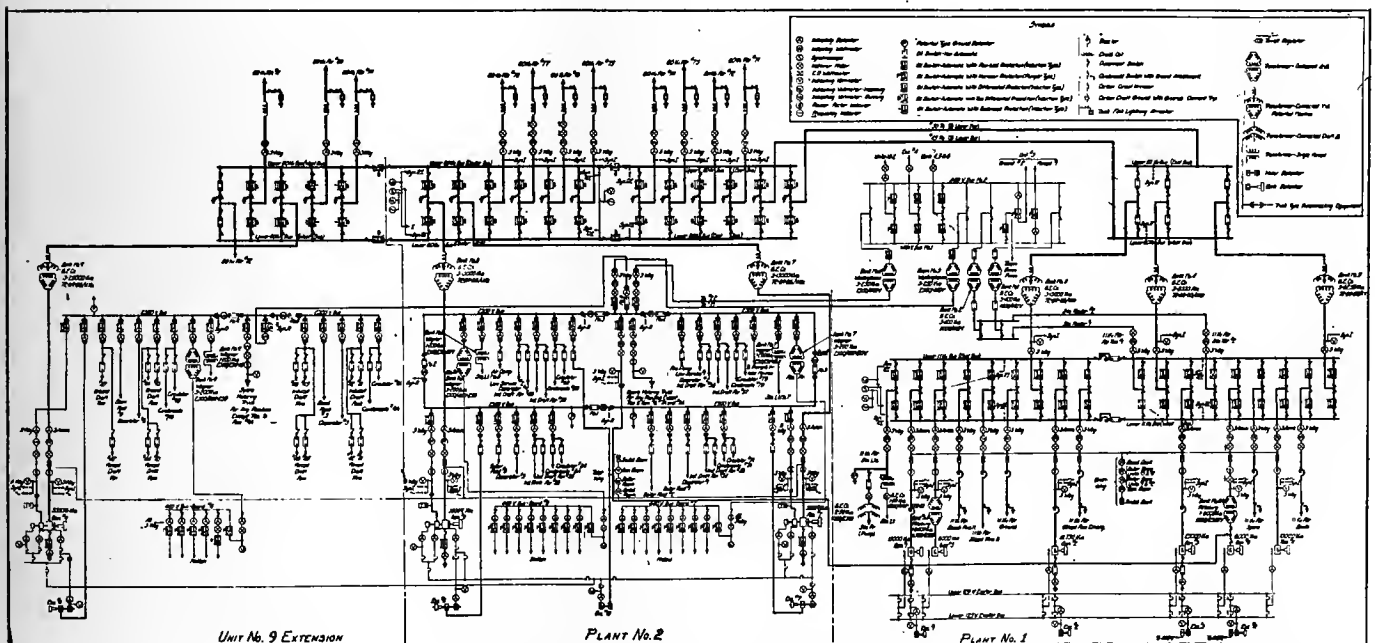


Fig. 1. Complete wiring diagram of the Long Beach steam plant of the Southern California Edison Company. Unit No. 9 addition appears at the left.

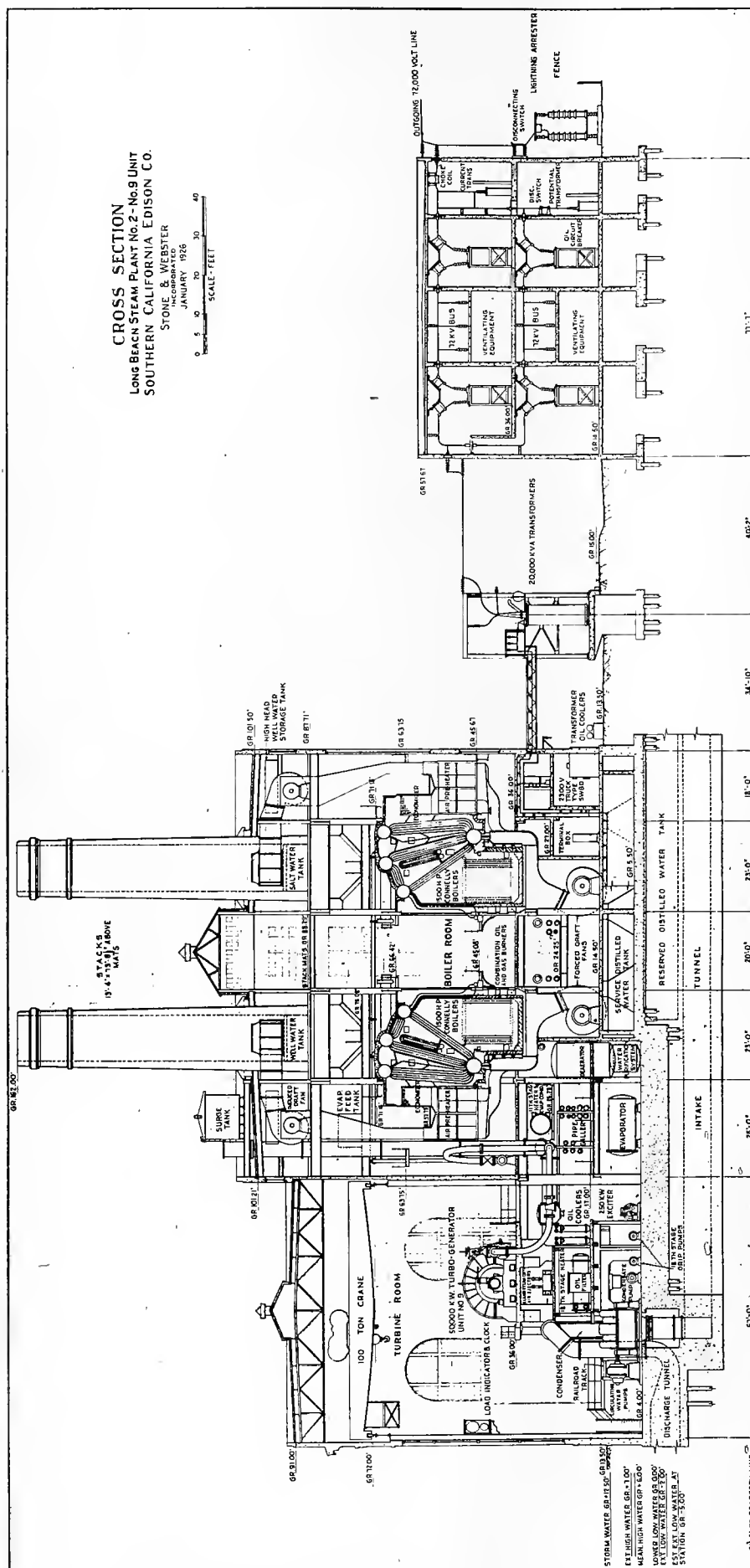


Fig. 2. Sectional elevation showing No. 9 unit, Long Beach plant.

per cent, a 60,000-kva. bank of transformers was installed for this ninth unit. Excess capacity allowances also were made in all other equipment.

Together with its 11/72-kv. transformer bank the unit is connected as a unit to the high-tension bus without low-voltage circuit breakers or buses. In a similar manner both the excitation and auxiliary-power systems are laid out as units with emergency tie lines only to other sources of power.

Low-tension conductors from the generator consist of 1,500,000-circ.mil copper cables, 4 per phase. These are insulated with varnished cambric with a flame-proof cover and are mounted on porcelain insulators in a large and well ventilated tunnel which passes under the boiler room to the outer wall of the plant. Here the cables give way to bare copper bars to which the instrument transformers are connected and which are carried out through wall bushings to the outdoor transformers in a well protected overhead housing of concrete and screen. The low-voltage bus at the transformers also is housed in a similar enclosure, largely to protect the closely spaced conductors and insulators from birds. Seagulls, of course, are very numerous at this sea-coast plant.

The transformer bank consists of 3 20,000-kva., 11/72-kv. single-phase units, with a fourth that can replace any one of these by changing connections without moving the transformers. Cooling is accomplished by circulating the transformer oil through external water-cooled heat exchangers. Provision also has been made in the plant design for replacing or supplementing these coolers with air-cooled radiators at a later date. The object of this latter is to permit the heated air to be taken into the fire boxes and thus add to the boiler output. Transformer bushings are over-insulated to protect them from the salt-laden ocean fogs. Transformers are



connected delta-star with the neutral of the 72-kv. side solidly grounded to ground rods and to a power ground bus of copper conductors that is carried to all high-tension insulator buses, circuit breaker frames, and instrument-transformer neutrals and cases. The transformers also form the end of a much heavier copper ground bus that extends from the general neutral and frame to all low-voltage insulator bases and power equipment.

From the transformers the 72-kv. leads pass to duplicate buses. These are indoors in a switch house separate from the generating station, as is evident from Fig. 3. The bus extension for the new unit has three feeder positions, sufficient to take the generator output, and is separated from the original sections by oil circuit breakers. Bus-sectionalizing breakers are interconnected with the overload relays on the feeders in such a way that the bus-section breakers will open ahead of feeders on heavy overloads. This provision is necessary to protect the circuit breakers from rupturing short-circuit currents in excess of their capacity, even though the largest available circuit breakers were installed.

Each circuit breaker is in a fire-proof vault equipped with doors that will close automatically in case of fire. Carbon tetrachloride fire-extinguisher spray heads are installed in each vault and may be operated from a distant point. While generators 7 and 8 have carbon tetrachloride fire-fighting equipment, generator No. 9 has been equipped with a system of carbon-dioxide extinguishers. These provide for automatically releasing a quantity of gas into the enclosed air-circulating system of the generator. A saturated gas atmosphere is maintained by the delayed opening of additional gas tanks.

### Control and Protection

To care for the control of the main electrical circuits two panels were added to the switchboard. This board is in three sections, a bench control board, instrument board, and relay board. It was manufactured by the Westinghouse company with standard instruments and relays used throughout.

On the bench board are the control switches for operating the main power circuits and the principal feeds to the auxiliary-power bus. In addition to the controls there are small knife switches that will disconnect the automatic relay trip from any circuit when desired. On the instrument board are mounted the usual indicating meters, including a governor-position indicator and a bulls-eye lamp to indicate an automatic tripping of the throttle. There also is a visual signal system for the transmission of definite signals between the turbines and the switchboard, such as "stop generator," "on line," etc.

The relay board contains the following:

- Differential relays for main generator protection
- Differential relays for main transformer protection
- Differential relays for auxiliary generator protection.

Overload relays for all 72-kv. feeders

Balanced relays for parallel 72-kv. feeders.

On the same board are mounted the integrating and the recording meters, as follows:

Watthour meter for main generator

Watthour meter for auxiliary generator

Curve-drawing temperature indicator for main generator

Totalizing element for total of station power.

Switchboard equipment, frame and instrument cases are all connected to a safety ground bus that grounds the equipment not directly connected with the power circuits, building steel, motor frames or other normally grounded positions. This ground system is not necessarily isolated from the power ground bus, but the power bus is arranged to carry its ground currents to the points sought by making the paths as short as possible. This prevents such currents from reaching unrelated equipment or passing over the safety bus, the latter being only to maintain auxiliary equipment at a safe ground potential.

### Auxiliary Equipment

The auxiliary power system involves more details and complications than do the main generator circuits. All motors over 50 hp., of which there are several as large as 450 hp., are operated at 2.3 kv. from the auxiliary generator mounted on the same shaft as the main unit. Smaller motors are operated at 440 volts and are served through a transformer bank from the 2.3-kv. system.

An assembly of truck-type oil circuit breakers forms the 2.3-kv. bus. This bus is divided into two groups by a sectionalizing switch so that trouble on either half will not incapacitate the main unit. A spare truck makes the replacement of any one circuit breaker very simple and possible without affecting any other circuit.

To provide emergency feeds to the 440-volt motors tie lines have been run between similar motor circuits of two main generator groups. A double-throw switch near each motor is used to select the source of power. In a similar manner two d.c. circuits have been carried from the storage battery to the valve control panels where a double-throw switch gives duplicate circuits to these important controls. In the control of the principal steam valves a secondary station has been provided outside the boiler room from which the steam lines can be cut off in case of emergency. The d.c. feed also is carried to an automatic switch for transferring part of the illuminating circuits to the battery in case of an interruption in the normal a.c. supply.

All motors are either push-button or automatically controlled and all constant-speed motors except the very largest are designed for starting at full voltage. An effort was made to use constant-speed motors wherever possible. Among the more interesting applications of automatic controls might be mentioned those on the draft fan and boiler feed pump motors. The motors on the induced draft fans are of the brush-shifting type and are equipped with a sensitive speed-control system manufactured by the Smoot Engineering Company. This system

is arranged to maintain automatically atmospheric pressure in the fire boxes of the boiler. The motors on the boiler-feed pumps are of the slip-ring type and are equipped with a Ruggles-Klingerman regulator that varies the speed to maintain the pump pressure above the steam pressure in the boilers.

For alarm circuits the annunciator system in the original switchboard room has been extended to include the new circuit breakers and contacts for hot generator and transformer alarm. At the turbine gage board a second annunciator is provided to indicate the automatic opening of auxiliary circuit breakers, high and low-water alarms, low vacuum,

excessive moisture in the generator cooling system, and other undesirable conditions.

A centrally controlled electric clock system synchronizes clocks located in the switchboard, boiler, and turbine rooms. For the calling of maintenance men numerous small electric horns are placed about the plant on which any given code call is repeated automatically three times upon pressing a single button.

The steam condenser of the main unit is equipped with the Electrolytic Protection Corporation's system of positive anodes for the prevention of corrosion.

## Addition of Ninth Unit to Long Beach Steam Plant---II

### Steam Equipment

By Raymond Wilcox

Steam Power Engineer, Department of Engineering Design, Southern California Edison Company, Los Angeles

**E**XTENSION of the Long Beach Steam Plant of the Southern California Edison Company to accommodate the newest and largest generating unit involved some features novel to the Pacific Coast and of especial interest to power plant men on the Western side of the Rockies.

The 50,000-kw. General Electric turbine was built in the same size casing used for the two 35,000-kw. machines installed in the plant two years ago. The increased capacity is taken care of entirely in the design of the blading and steam passages. This made possible the uniform extension of the generating room and the turbine platform. An advantage of this turbine construction also is reflected in the interchangeability of bearings and other parts.

It has been found possible to carry loads of 45,000 kw. continuously for long periods on the 35,000-kw. machines and a capacity in excess of 60,000 kw., with full-extraction feed-water heating is anticipated for the new unit.

Steam conditions at the turbine throttle are 365 lb. pressure and a total temperature of 725 deg. F. In the feed-water heating cycle the condensate passes through the eighteenth stage extraction heater, the gland steam condenser, the air ejector after-condenser, and the deaerating vented heater which normally is supplied with steam extracted from the fifteenth stage. Full-load temperature at this latter point is 248 deg. F., and the pressure of the condensate is increased by booster pumps to 165 lb. After passing through the booster pumps the feed water is used to condense the evaporator vapor and then passes through the eleventh stage extraction heater with a final temperature at the boiler feed pumps of 360 deg. F. Evaporators are supplied with steam extracted from the eleventh stage of the turbine. The feed-water heaters were manufactured by C. F. Braun & Company of Alhambra, Calif., the deaerator by the Cochrane Corporation

and the evaporator by the Griscom-Russell Company.

The condenser, a picture of which appeared on page 548 of the Journal of Electricity for June 1, 1926, is of two-pass divided-water-box type with 75,000 sq.ft. of tube surface. The tubes are rolled into the tube sheet on the inlet end and project about 4 in. in from the face of the tube sheet. The projecting ends are slightly belled to improve the entrance flow of cooling water. The condenser, circulating-water pumps, and condensate pumps were

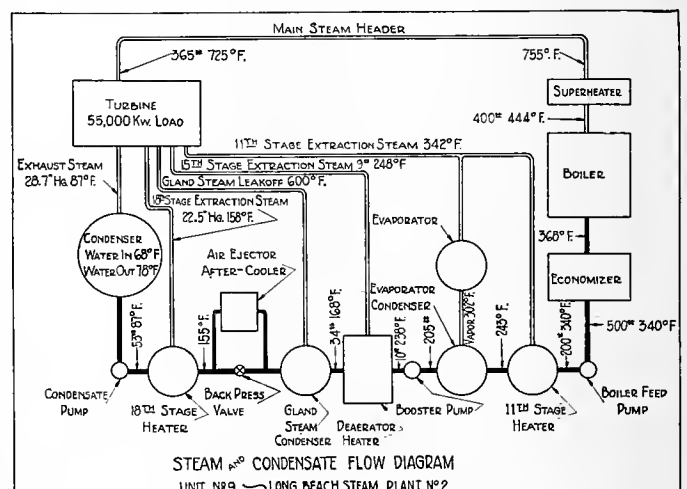


Fig. 3. Heat-balance diagram for No. 9 unit, Long Beach steam plant.

furnished by the Westinghouse Electric & Manufacturing Company. Temperature of available condensing water varies from 58 to 72 deg. F. The capacity of the circulating water pumps is 100,000 gal. per min.

#### Boiler House

In the boiler house is found the greatest change in design in the extension of this plant. Seven new Connolly boilers furnished by the Llewellyn Iron

Works of Los Angeles are installed. They are of the four-drum bent-tube type, 50 tubes wide and each having 15,000 sq.ft. of surface. They are equipped with water-cooled side and front furnace walls. These walls, manufactured by the Bailey Meter Company, now a subsidiary of the Babcock and Wilcox Company, are constructed with refractory-faced blocks clamped to the circulating tubes. These are the first boilers on the Pacific Coast to be equipped with this type of furnace. The use of water-cooled walls was considered necessary with the use of preheated air. Floors and bridge walls of the furnaces are air cooled. During preliminary operation preheated air temperatures of 275 deg. F. and stack gases as low as 225 deg. F. were realized. Air preheaters were manufactured by the Green Fuel Economizer Company and economizers installed were made by the Power Specialty Company.

Six of the new boilers are equipped with Foster 3-loop protected-surface type of superheaters. No cores are used in these superheater elements, but hollow plugs in the inlet ends of the tubes are employed to insure even distribution of the steam throughout all of the 80 elements in each superheater. The seventh new boiler is equipped with an Elesco superheater.

In addition to the usual boiler gage-board instruments each boiler has a multi-point Leeds and Northrup temperature recorder. This places before the operator a continuous record of temperatures of the superheated steam, gas leaving boiler, water leaving the economizer, gas leaving the economizer, aid leaving the preheater, and gas leaving the preheater.

### Miscellaneous Equipment

Manually controlled forced-draft fans force the air for combustion through the preheaters and air-cooled walls. Automatically controlled induced-draft fans maintain a balanced pressure condition in the furnace. Gas fuel is available from the adjoining city of Long Beach when domestic requirements are light. Combination oil and gas burners of the swing-front type manufactured by the Peabody Engineering Corporation are used.

The oil burners are of the mechanical atomizing type, the oil being heated in heat exchangers using live steam. No oil meters were installed in this extension of the plant because of previous unsatisfactory experience with them. Gaging and liquid-level recorders will be relied upon for computing the oil used from the service tanks.

A motor-operated gate valve has been placed in the steam lead to the turbine adjacent to the throttle valve. This valve is in addition to the usual gate valve against the main steam header. The purpose of this additional valve is to permit keeping the 20-in. steam lead to the turbine hot without risk of steam leaking past the throttle valve when the turbine is shut down. An open blow between the gate valve and the throttle valve insures this safety. It was found that, in starting up the other turbines, about 45 min. were required to heat up the turbine lead. The additional valve will eliminate

this delay in starting the new unit. Valves in the main steam piping were furnished by the Chapman Valve Company and the cast steel fittings were made locally by the Warman Steel Casting Company.

In connection with the extension of the plant for the new boilers, sand filters and Zeolite water softeners were installed to treat the make-up water for the evaporators of all three units. These were put into service several weeks before the new turbine was ready to operate. Experience had shown that

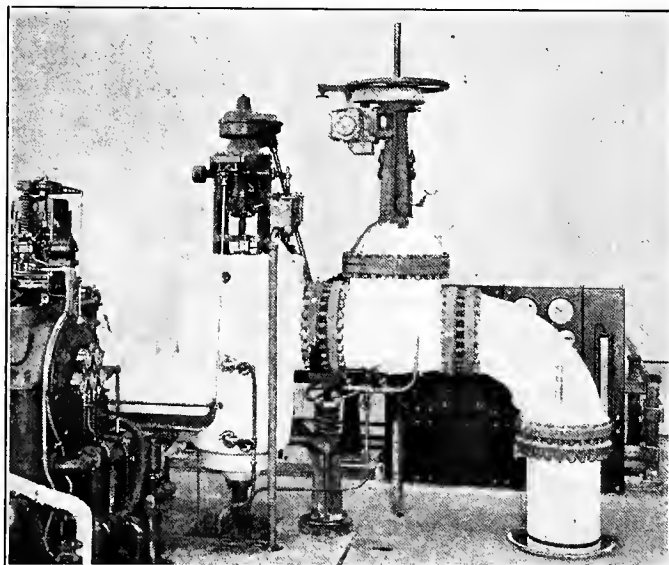


Fig. 4. Steam lead to No. 9 turbine showing throttle valve and motor-operated gate valve.

the capacity of the evaporators steadily decreased until it became necessary to rasp and hammer the hard scale off the evaporator coils. Since the installation of the softeners the performance of the old evaporators has shown a remarkable improvement and scale is loosening and falling off the coils and passing out of the evaporators through the blow-down. No scaling of tubes in the new evaporator has been observed. The filters and softeners were manufactured by the Cochrane Corporation and furnished by C. C. Moore & Company.

About four points better efficiency is expected of the new boilers equipped with air heaters and water-cooled walls. However, at higher vacuum and heavy loads the performance of the new turbine may not be as good as that of the 35,000-kw. machines due to the crowded steam passages. On the average a somewhat better economy is expected of the plant because of the improved new equipment installed in the extension. Under the favorable load conditions which obtain in those periods of the year during which a large percentage of the Edison system load is carried by the steam plants an over-all plant thermal efficiency of 14,500 B.t.u. is expected.

The new turbine and equipment were installed and the extension of the Long Beach plant was carried out under the supervision of G. C. Ward, vice-president in charge of construction of the Southern California Edison Company. Stone & Webster, Inc., were the engineers and constructors.

# Rural Electrification from an Economic and Engineering Standpoint—I

## Economics and Development of Rates

By L. S. Wing\*

Engineer, California Farm Bureau Federation, San Francisco

THE question of extending electric distribution lines to rural districts is not alone one of poles and wire—so many insulators and transformers—but one of maintaining the standard of living of thirty-five millions of rural people on a parity with their eighty millions of city cousins. Much has been said during the past four years of the problem of rural electrification and there is at present a great urge in that direction. Many prominent men have expressed their views on the subject, and leaders of the electrical industry have shown a keen interest and appreciation of the obligation of their industry to render service to rural communities. There are those, however, representatives of both electric utilities and agriculture, who see the problem only from a cold statistical point of view, and they gingerly examine the facts presented, applying safety factors and contingency percentages to every unknown until they arrive at results which appear most discouraging. Cost accountants and rate analysts have produced many valuable data but not the final answer. Service to the agricultural industry is too complicated to be solved by a mathematical formula. It involves social demands and responsibilities which are just as important as the kilowatt demands and system peak responsibilities with which they must be considered. The agricultural industry is the real backbone of the nation, and those engaged in it have a right to demand that they be given an opportunity to maintain themselves upon a plane of living comparable with workers in other industries.

At the inception of the electric industry some forty-four years ago its promoters were obliged under the then competitive conditions to develop such loads as promised the greatest profits; the struggle was for survival, and the failures were many. Today under public regulation this condition no longer exists. The central-station industry is regarded as one of the safest of investments; it is

*WHILE much has been said in recent years on the subject of rural electrification, there are some phases of the problem yet to be solved. In this paper, which will be published in two parts, the author, who is a representative of the farming group, discusses the questions of rates and rural extension policies with special reference to the progress which has been made in California where the greatest rural electrification development has taken place.*

one of the few that can boast of never having experienced a reduction in its gross revenue. The industry is firmly established; it operates as a monopoly, generally under state control, and as such it owes a duty to the whole territory, both urban and rural, in which it is located and not to certain especially profitable sections which selfish interests might dictate as being the reasonable confines of its service area.

This comment should not be interpreted as meaning that the farmer is to be sub-

sidized by the state, the utility that serves him, or its present consumers. It does imply that further reduction in existing urban rates may have to be postponed in some cases in order that the utility may pioneer rural lines; also, that the utility forego what might be termed a full return upon its rural investment during that development stage of the business. The farmer must be served from the start at rates he can afford to pay and which make further use of this power attractive. Rates based upon eight and ten per cent return upon the investment from the start, with full pro rata allocation of all operating costs and fixed charges, will serve only to stifle development. The rural load must pay its share eventually, but it cannot be expected to spring fully matured and developed from the seed. No other class of load served by the electrical industry has been fully profitable from its inception.

What the farmer can pay and the amount of his annual consumption will depend entirely upon how much electricity he can use beneficially to supplant present sources of fuel and power and the scale of living he can afford. With the introduction of electricity into rural districts that standard of living will be raised; soon what was deemed a luxury will become a necessity just as have the telephone, the automobile and the radio.

Vision is needed when dealing with a problem so full of possibilities. Rural revenues and cost-of-service studies based on present and probable energy consumption of 300 to 1,000 kw-hr. per

\* Extract from a paper before the annual convention of the American Society of Agricultural Engineers, Lake Tahoe, Calif., June 23-26, 1926. The second and final section of the paper will appear in the next issue.



farmer per year are not only discouraging but misleading. Rural service in general cannot be justified economically with such a low consumption. There exists a great opportunity to better living conditions on the farm and to cut down the cost of farm labor. Considering present applications, electricity can be sold in many rural districts only in quantities which will make the load profitable to both the utility and the farmer. This is the only foundation upon which rural electrification can rest safely.

To anyone studying the problem of rural electrification for the first time three questions naturally might occur:

1. What factors in the past have influenced electrical rates and the extension of service to new loads?
2. What form of rural rates and extension policies have been used, and with what success?
3. What are the factors to consider in determining the amount and form of rural rates and the terms of an extension policy?

Any one of the above topics might be made the subject of a paper, so necessarily the treatment given here must be somewhat general.

At the beginning of the central-station industry the only loads served by the companies were street, business and residence lighting. Rates were high because plant investments were high in proportion to the amount of energy sold. The subsequent reduction was made possible only by the development of the electric motor and its widespread application and use in the railway and manufacturing industries. To illustrate this effect upon the cost of power typical load curves of the period from 1882 to 1900 and for the period from 1912 on are shown in Fig. 1. In the earlier period the annual peak, practically all lighting, occurred about 6 p.m. on a

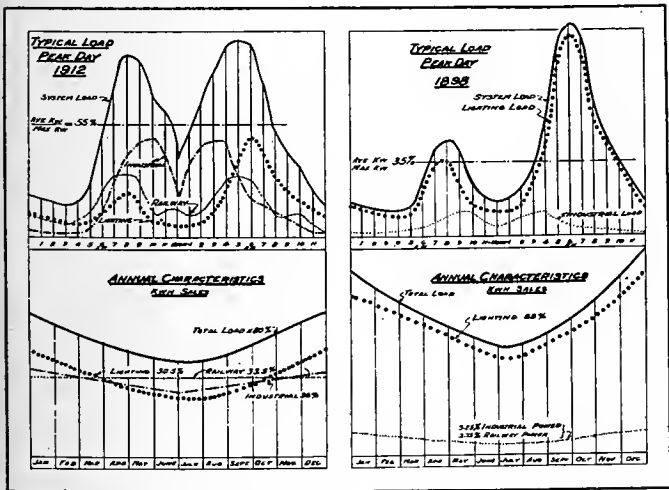


Fig. 1. Typical load curve during early development of electrical industry.

winter day. Even the development of railway and industrial loads has not changed peak conditions materially in the Middle West and East; the load curve still contains a summer "valley."

In this respect California and other Western states hold a unique position. The presence of the agricultural motor load used in connection with

irrigation which is on heavily in summer and off in winter fulfills perfectly the needs of the central-station industry. This load has increased the system load factor so greatly that production and transmission costs to California utilities are generally far less than they would be to Eastern utilities, regardless of power sources. In fact, the ex-

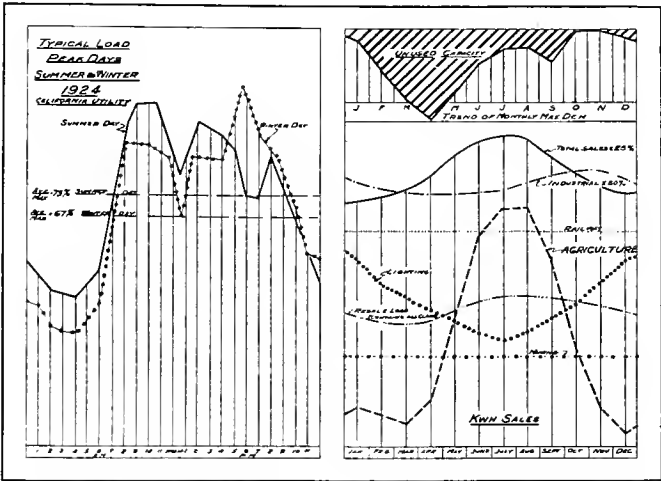


Fig. 2. Typical load curve for large California utility in 1924.

istence of the agricultural power load should be valued almost as highly as that of hydroelectric resources which are so abundant in this section of the country. Each has contributed a large share to the cheap production of electricity.

The present daily load curve of one of the largest California utilities is shown in Fig 2. It has an annual load factor of 62 per cent; its connected load is made up of lighting, cooking, heating, industrial power, railway, mining and agricultural power for pumping, which accounts for its unusually high annual load factor. The summer peak is nearly as high as that in winter. Particular attention is directed to the shape of the agricultural power sales curve and the manner in which it fills in the summer valley; also to the effect of this load upon the monthly peak demands. Many of the loads at present served by this utility at a profit could not economically be served separately with electrical energy.

In the same way that many different kinds of loads can be served more economically by one system than they can separately, so it is often in the case of utilities themselves. The consolidation of small electric companies into large systems and the interconnection of these large systems have proved very beneficial to all users of electricity, for they have made possible higher load factors, thereby decreasing the amount of idle equipment on which consumers had to pay fixed charges.

From the foregoing, it is evident that any breaking down of system loads into their component parts such as is threatened by numerous municipalities throughout the country at the present time can result only in undoing the progress already made and postponing the day when universal rural electrification will become an accomplished fact, for

it is certain that only with the economies effected by a highly diversified local load, coupled with the further economies which result from interconnection and consolidation, is general rural electrification possible.

### Forms of Rural Rates

Agricultural electric rates and extension policies, contrary to general opinion, have a history covering a period almost as long as that of any load except lighting. The first electric motor-driven pump used in connection with irrigation of farm crops in California dates from the year 1898. This was served by what is now a part of the Pacific Gas and Electric Company's system, and is an isolated case. In 1889, however, a utility then known as the Mt. Whitney Power & Electric Company commenced service to several small towns and contracted generally to supply power to farms for the purpose of driving irrigation pumps. The initial deliveries were made to ten farms, aggregating a connected load of 174½ hp. The rate charged was \$50 per hp. per year.

The agricultural power rate of \$50 per hp. per year was based upon the cost of supplying power for irrigation from the only other available source of supply, namely, gasoline and steam engines, and the cost of supplying this service electrically. The company management chose the flat rate because its power was produced in a hydro plant and the annual fixed charges constituted practically the entire cost of delivering energy. Also the rate was simple, the farmer knew exactly what the new form of energy would cost and the company was assured a stable income.

The connected load records of this utility report the agricultural motor load as follows:

1899.....	174.5 hp.
1904.....	1,406 hp.
1907.....	2,928 hp.
1909.....	4,430 hp.
1911.....	6,654 hp.
1914.....	12,470 hp.

Gasoline-engine competition was keen during this entire period, and it was not until 1910 that the electric motor became a real factor in irrigating farms in this state. Since that date growth of rural electrification has proceeded at a rapid pace until today it is estimated that between 60 and 80 per cent of all California farms have electric service. No accurate figures have been compiled yet for 1925, but it is certain that between 600 and 800 million kilowatt-hours of energy now are being consumed annually in rural California for irrigation, cooking, heating, lighting, etc. This is more than is used for similar purposes in like territory in all other states. The present electrical connected load of all kinds on California farms likely is in excess of 750,000 hp.

As almost every crop grown in the United States and every branch of agricultural practice may be found somewhere in this state, the form of rural rates and extension policies used here and found satisfactory should be of interest to all. The va-

rious types of agricultural power schedules which have been tried out are too numerous to be listed here. Practically all of them have proved unsatisfactory in practice and gradually have been eliminated from use until today the major portion of all power used in irrigation practice is sold under two forms of schedules, and the time is not far distant when all power used by farmers will be sold under one type of schedule known as a two-part rate or the demand and energy type. Several of the more prevalent types of schedules are represented graphically in Fig. 3.

Agricultural power was sold first under the "flat rate" schedule which already has been mentioned.

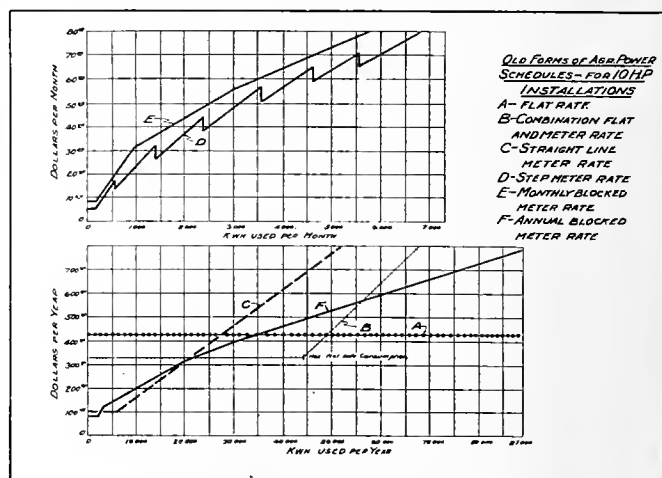


Fig. 3. Early types of rural rate schedules.

It is indicated by the line "A." This type of rate is particularly objectionable in that it encourages waste of energy; the consumer often uses more power than he needs. Also with this type of schedule the short-time users make up the losses incurred in serving the long-time consumers. This type of rate flourished in many forms. The periods covered by the flat rate ranged from one month's use to twelve months; some schedules were for daylight operation only, or for certain months, the company attempting to keep the motor from operating during the peak demands.

Flat-rate schedules in 1903 were combined with metered rates and afterwards gave way to them entirely. (See Curve B.) The first meter rates were of the "straight line" variety. (See Curve C.) The charge varied with the size of the installation, with a monthly or annual minimum charge for the protection of the company. This type of schedule was likewise discriminatory; it compelled the long-hour consumer to pay the losses incurred in serving the short-time operator. Metered rates of this type were given practically the same variations as had been given to the flat rate. The minimum charges were varied for the months of the year in which the plan operated; different rates were made for daylight use than for continuous service. The kilowatt-hour rate sometimes varied with the size of the installation and the schedule usually carried a rather high minimum charge. None of these schedules followed a reasonable cost of service curve.

Another type of rates used is that called the "step meter rates." This type of rate, shown by Curve "D," had a minimum charge based on the size of the installation, and straight line energy charge which varied each month with the load factor of the motor. It was often cheaper for the consumers to use more energy and thereby get into the next lower "step." It did not follow closely the cost of service and was discriminatory.

Another form of meter rate, shown by Curve "E," subsequently was used to a considerable extent and this also resulted in discrimination between customers. This was the block-energy form of rate with a monthly minimum charge similar to present lighting schedules. A consumer started each month with a high-cost energy block, then as his monthly use accumulated he would pay progressively less rates for each block of energy used. With this kind of schedule it became necessary for the farmer to guess the date the meter reader next would appear and crowd into the interval all the consumption possible in order to get a low rate for the month, or else wait until the meter was read before starting to irrigate. This was often done when it would have been more advantageous to both the farmer and the utility if the farmer could have spread his use throughout two, three, or more months in accordance with his needs and convenience.

The latest type of schedule employing the blocked meter rate with a minimum charge is one still used to some extent in California. It is indicated by Curve "F." While it is not entirely satisfactory, it is a great improvement over its predecessors as the minimum is on an annual basis and varies with the size of the installation; the energy is blocked also on the basis of the size of plant and the rate varies with the number of kilowatt-hours the plant consumes annually. The form of rate, however, which is now used almost entirely for the sale of agricultural power is the two-part rate; the demand charge is stepped according to the size of the installation, and the energy charges are blocked according to the annual consumption. This rate schedule is illustrated in Fig. 4. This type of rate follows as closely the cost of service as commercial considerations will permit; it is simple in application and easily explained and justified. Experience with the various rate forms and economic considerations have led to the following conclusions relative to schedules for agricultural power purposes. Most of these conclusions are general and would be applicable to any service sold to rural consumers. Some, however, refer only to the sale of energy for power uses in the West.

#### Desirable Features of an Agricultural Power Schedule

1. The company should own and maintain all facilities for rendering service.
2. Where a large part of the energy generated by the company is produced in hydroelectric plants, the rate for power during the spring run-off should be low.
3. The major portion of the annual charges should be collected in the months of maximum use.

4. Rates for each size of installation should follow, as nearly as practicable, the cost of service, but the schedule should contain sufficient differential in cost due to size of installations as to discourage the use of larger motors than required.

5. Each consumer should pay at least the cost of service directly incurred in serving him.

6. The rate must be low enough to meet the competition of other kinds of available power.

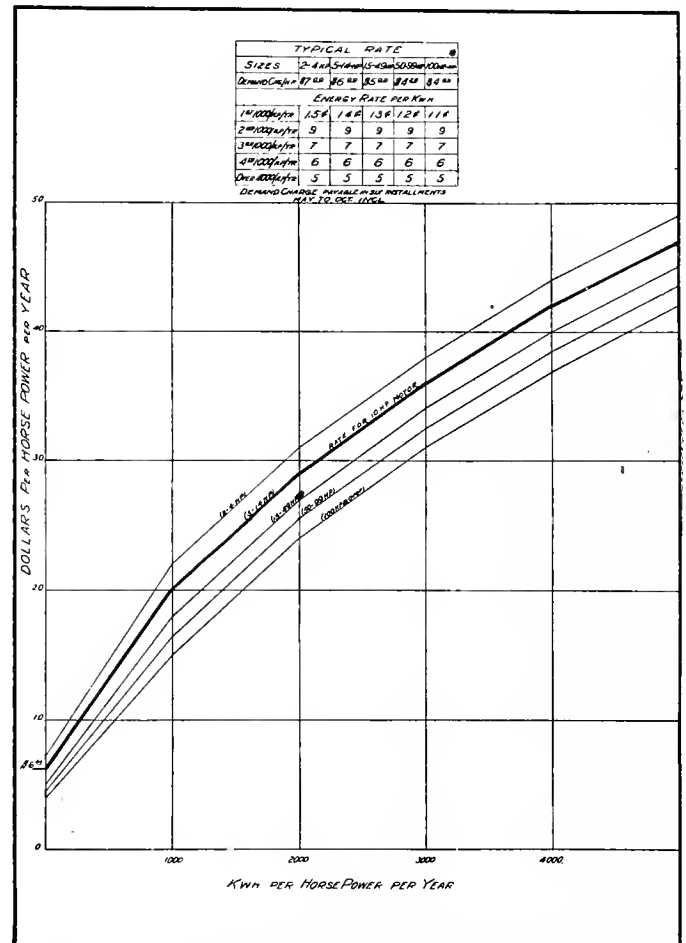


Fig. 4. Two part rural rate now used extensively in California.

7. The rate for energy, aside from "readiness to serve" charge, should be as low as the total cost of serving will permit.

8. The rate schedule should be simple.

9. The rate schedule should collect charges on an annual basis and permit use of plant at consumer's option.

10. The rate schedule should be applicable to all classes of farm power service.

11. Only one rate schedule should apply to the service used.

12. Charges made under the rate schedule should be based upon factors directly within the consumer's control.

#### Ownership of Service Facilities

The first important feature which should be incorporated in a rate schedule is ownership by the utility of all facilities used in the rendering of

service; that is, everything up to and including the meter. (Future development of load may justify even the inclusion of large motors for temporary service.) Only large consumers can afford to have someone competent to inspect and repair electric equipment always available. The average man does not know that a fault has developed until after it has done visible damage; he usually has to call in an electrician to make even minor repairs and replacements.

Transformers require attention periodically; insulators, wires and switches should be inspected carefully in order to prevent serious damage at a critical period of operation. The utility's force of trained men is best equipped to perform this service.

When purchase of transformers and line material is left to the consumer, he often buys from a price standpoint rather than quality and soon finds that he has purchased inferior equipment. Even when the utility furnishes and installs the equipment and then bills the consumer for the cost the problem is not entirely solved.

Farming, like any other business, requires intensive application of thought and energy in order to make it successful. Every new element injected detracts from the business of farming and takes time which should be given to the growing of crops or the raising of herds. Not infrequently it is difficult for the farmer to finance power lines, and he should not be obliged to use for this purpose money required in his business or for the purchase of power utilization equipment. It is not always possible for a utility to extend its lines to serve consumers without some advance on their part, as there is a limit to the distance to which power lines can be extended economically without making the company's investment so great that it would require higher rates from all consumers in order to pay the additional fixed and operating charges. In these cases it is proper that the farmer or farmers should advance to the utility a reasonable amount towards the excessive cost of the particular extension, but this advance should be returned to them as quickly as the new business becomes profitable.

### Desirable Features

The second desirable feature can be accomplished by a rate schedule on an annual basis in which the consumer's year, with the high-priced energy blocks, starts just after the flush hydro run-off where this is a factor. Practically all agricultural power schedules in California are so designed, and this feature has had a marked effect upon increasing the annual load factor of the consumer and also beneficially utilizing hydroelectric energy which otherwise would have been an economic loss.

There are two reasons why the consumer should pay the major portions of his bill during the period in which he makes the major use of his installation. First, he mentally measures the cost of the service which he receives with the use he has made of it, and usually fails to consider that a large portion of the cost of service is composed of fixed charges which continue regardless of the use made

of the equipment. Collecting fixed charges during months in which little or no use is made of equipment is to him equivalent to "paying for a dead horse." The second objection arises when a renter is operating a farm. The majority of farm operations take place during the summer months, so if the renter leaves in the fall he often has not paid a proper share of the fixed charges on the plant since it may have been installed chiefly for use in the summer season.

The rate schedule should be designed to follow as nearly as practicable the trend of service cost for each size of installation. This cost increases so very rapidly per horsepower for small sizes of motors that in practice it is not feasible to charge them with the same proportion of demand cost as the larger sizes. By maintaining a differential in costs and favoring the smaller sizes, over-sized installations are discouraged and a better load factor maintained. In the past, rates often have been designed which permitted a large installation to operate at a low load factor at about the same cost as a small plant at a high load factor; with the result that consumers usually installed larger motors than required and costs of serving them were higher than warranted.

Point number five is the one most likely to cause misunderstanding between the consumer and the utility. While most everyone readily will concede the fairness of each individual paying the costs of service which are incurred solely for his benefit, yet the attempts of utilities to collect these charges in the form of so-called "minimum charges," "demand charges," "readiness to serve charges," "service charges," or "meter charges," has led in many cases to either misunderstanding or dissatisfaction. A more comprehensive examination of this part of the rate schedule therefore, is justified and will be taken up later.

### Meeting Competition

Competition from existing and potential sources of substitutional service always must be considered in making a rate. Fixed charges and general expenses cannot be assessed against each class of service on a proportionate use or demand basis and then rates derived therefrom that will be practicable. Average costs also have proved valueless in solving commercial problems. Careful consideration must be given to what the consumer can afford and is willing to pay for use of energy for each application to which the rate applies; he measures the reasonableness of the rate by the service which electricity performs for him, and what it costs to perform similar service by other methods—not by so many cents per kilowatt-hour. For lighting he will pay the highest rate; for space heating, the lowest.

A low energy rate encourages greater use and a wider application of electric service. A properly designed rate schedule makes the consumer mentally charge against the higher user such as lighting, refrigeration, and the operation of small domestic appliances a large portion of the fixed charges.



Further use of electricity for cooking, water heating and general farm operations then becomes profitable, as the additional energy charge alone needs to be considered. In other words, the farmer looks upon these applications in exactly the same way as did the early central-station managers when they made low rates for power in order to reduce their average cost of production.

One of the most important features of any rate is that it be simple. The simplest form of schedule is the flat rate, but this type does not spread costs of service equitably among consumers. The two-part rate is relatively simple; it is easily explained and justified if the demand charges are not made too high, since the major portion of the demand charge usually is comprised of items with which the farmer is familiar, such as interest, depreciation and maintenance of meter, service, transformer and distribution lines, meter reading and billing. It is also essential that the consumer be able to check his bills from the schedule of rates.

The undesirability of monthly type rates previously has been pointed out. They not only make it more difficult for the farmer to estimate his power costs, but add another element of chance to his operations. Monthly type rates are also basically wrong since they make various charges for the same service, although the cost of rendering that service is practically the same in each case. The greater portion of the costs which make up the total amount charged agricultural power consumers are interest, depreciation, taxes, and maintenance. These are costs which normally are figured on an annual basis, and whether a consumer uses all of his consumption in one month or spreads it over six months or more is of no consequence, if his maximum demand is the same in amount and time, as it does not in any way affect the amounts of these major items.

Schedules for lighting, cooking and other services which apply to service used fairly uniformly throughout the year may be charged for on monthly schedule, one in which the consumer starts each month's use at the highest block, without any great discrimination occurring.

If possible, all farm power used should be taken through one meter. This gives economy in investment, meter reading and billing, and also encourages greater use of energy by the consumer since the average rate becomes less as the load factor increases.

Until quite recently most California power companies offered numerous optional schedules for agricultural power service. The choice of the proper schedule was impossible unless the use of energy was known definitely in advance, which was seldom the case. Much misunderstanding, dissatisfaction and useless work resulted from this cause. One properly designed schedule should take care of all energy used for power purposes in permanent installations.

Charges made under a schedule should be based upon the equipment installed by farmer and the use he makes of it. It is true that the amount properly

chargeable to the consumer depends upon the size of meter, transformer, cost of service wires, and the like, but these are items concerning the cost and operation of which he knows nothing. He is a farmer, his business is the production of agricultural products, not investigating the reasonableness of the size of wire used in the distribution system, or maximum demand of his load and the kva. capacity of the transformers required to serve it. If he puts in a 10-hp. motor and the rate schedule approved by the Public Service Commission says that he must pay a demand charge of \$75 annually on this size of motor and that the energy rate is 3 cents per kw-hr., he will not question the correctness of the charge. But if he is charged the same amount and the charge is based on the size of the meter or transformer installed by the company, he likely will have a suspicion in the back of his head that a smaller size would have answered the purpose quite as well, and that it is just another way the "soulless corporations" have of getting misgot-ten gains. Wherever possible, schedules should be written in terms with which the farmer is familiar and be based upon factors over which he exercises direct control.

### The Combination Rate

What is known as the "combination rate" is used almost universally in both urban and rural districts for domestic service where cooking and heating are involved and for this purpose this type of rate is satisfactory. It permits the entire household use to be taken through one meter. A graphical repre-

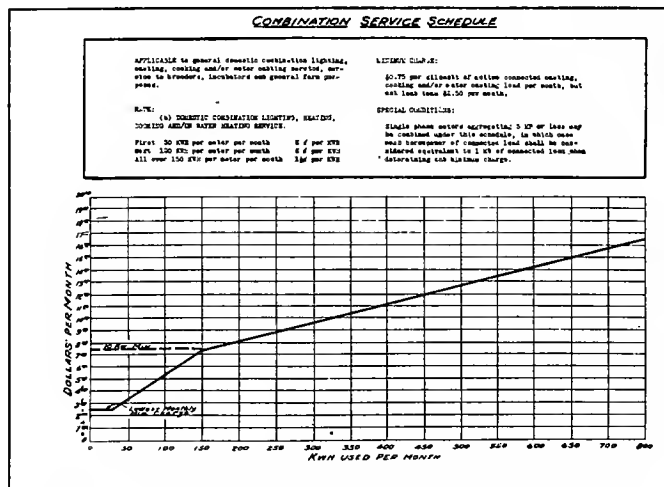


Fig. 5. Combination domestic service rate used in California.

sensation of the rate is shown in Fig. 5. Single-phase motors up to 5 hp. also may be served under this type of rate. Operation of such motors usually will be upon the last energy block, so the fact that the schedule is of the monthly type will not be discriminatory for small power uses although seasonal in character. Under this type of rate the first block is designed to cover lighting and small appliance use, the next refrigeration and cooking, the last block heating, operation of brooders, incubators and general farm power applications.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Automatic Sub Increases Track Capacity 11 Per Cent

Emergency Remote Control Provides for Extra Operation  
Station Normally Controlled by Time Switch

By H. P. BELL, Chief Engineer, Key System Transit Company, Oakland, Calif.

A 15,000-kw. automatic substation located out in San Francisco Bay about two miles from the eastern shore now serves one of the heaviest concentrations of traffic in that entire region. This station is one of the largest automatic railway substations now in existence and is in a class entirely by itself as far as its system of control and operation is concerned.

The Key System Transit Company operates a combination electric interurban and ferry-boat service between the several communities on the inland shore of the bay and San Francisco on the peninsular side. The ferries operate from the Ferry Building at the foot of Market Street in San Francisco to a pier terminal connecting with the inland shore, a distance of about three

the safe temperature limits of the equipment, would "back off" from the load but still hold operating voltage on the line. Thus a motor-generator set with shunt-wound generator, special control features and other characteristics described below was selected to meet the demands imposed upon this particular station.

The new substation is located at the bay end of the 2-mile fill mentioned above and is practically surrounded by salt water. The floor level is 7.7 ft. above normal high-tide level. This location necessitated great care in the construction and installation to combat and overcome the effects of salt water and salt air. Earthquake hazard also was given proper consideration in the design, construction and support of the building. The structure itself is of reinforced concrete and rests on concrete piling. The piling was driven practically to the point of refusal into the hardpan underlying the surface mud; driven until 32 blows of the 5,000-lb. driving hammer sank a pile but 1 in. The final length of pile was between 30 and 35 ft.

As indicated in Fig. 1 the building is unique in its simplicity and in its system of ventilation. Three sets of louvers, one just above the floor line, one just below the coping and a third in the monitor roof, provide an abundance of fresh air and excellent circulation. Provision is made for the future installation of forced ventilation when that expedient shall be necessary to delay the action of the temperature-overload feature of the automatic equipment.

### Equipment

All equipment was furnished by the General Electric Company. The rotating machinery consists of a 1,500-kw., 600-r.p.m., 600-volt generator directly connected to an 11-kv. synchronous motor. (See Fig. 2.) Power is selected automatically from either one of two incoming 11-kv. lines. Two sets of disconnecting switches are installed in each line so that either one may be used as the preferred or the emergency line. The equipment is set up to operate normally on the line designated as the preferred line.

Safety to life and limb was kept in mind in the design of the high-tension structure. A barrier wall was carried up to a height of 5 ft. in front of all of the 11-kv. risers. This prevents accidental contact with the risers. Openings to the horizontal bus compartments are closed with transite covers

held in place by phosphor-bronze springs. The bus and switch structure is of non-reinforced concrete. With the exception of the slabs used for the horizontal compartments the structure is monolithic. The central longitudinal wall is extended upward with transite inserts to act as barriers be-

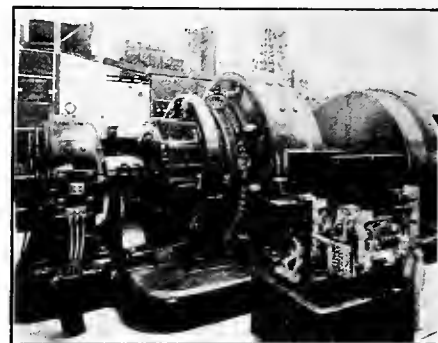


Fig. 2. Motor-generator set; high-speed d.c. breakers in foreground, instrument board in background. Key System substation. Photo courtesy G.E. Co.

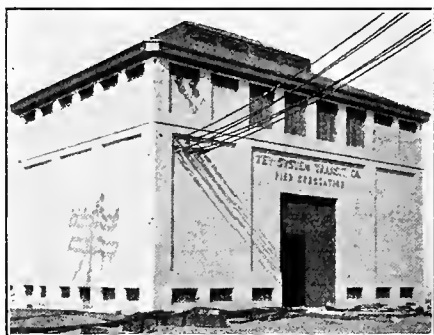


Fig. 1. Exterior of Key System substation. Note ventilator openings near ground line and beneath eaves. Cables in foreground are temporary leads.

miles. From the pier terminal there is rail connection with the mainland, operating over about a mile of trestle and about two miles of fill. A double-track line traverses this distance, the various branch lines fanning out from the shore end to serve the several population centers located beyond that point.

Trains traveling to and from the pier terminal consist of from one to eleven cars each and operate in groups under a 50-sec. headway to meet boats running on a 20-min. regular and 15-min. peak-load schedule. In this manner 638 trains per day are operated through this 3-mile "throat" of the system. It was to meet the exacting power demands of this portion of the system that the new substation was designed and built.

This application called for a most reliable installation which would operate successfully on large overloads for short periods and, when overloaded to

tween the line and the load side of the H-type oil circuit breakers. Thus each terminal of these breakers is enclosed in a compartment by itself, reducing the fire and arc-over hazard. (See Fig. 3.)

Above the gallery floor the arrangement of switch cells with rigid structures at the ends permits the H-type oil breakers to be installed in compartments which are open on both sides. This markedly improves the maintenance conditions. The north rigid cell contains the 3-phase power transformer that supplies the control-power generator and the reverse-phase voltage relay. The south rigid cell encloses a single-phase K-132 oil circuit breaker connected to a 100-kw., 11/2.3-kv.

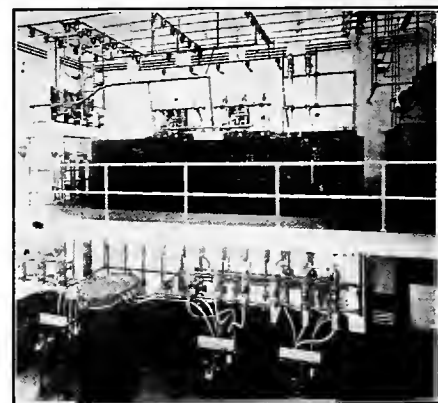


Fig. 3. Bus structures and equipment. Individual switch cells above and a.c. bus compartments immediately beneath. Three-phase power transformer appears in left foreground. Key System substation. Photo courtesy G.E. Co.

transformer that supplies lighting service to the pier terminal. This switch is automatic reclosing to re-establish service three times if opened on short-circuit; the switch automatically locks out after the third operation.

All control wiring in the station is lead-covered cable and is carried in a continuous pit which runs from the switchboard at the west side of the building to the east wall. From this pit fiber conduits branch out to the various devices. This arrangement was adopted to avoid trouble in the possible event of water coming into the building due to freak storm or tide conditions.

### Operating Features

The equipment is designed to operate continuously under a 150-per-cent load for a maximum of 2 hrs.; and to operate for 1 min. at 300 per cent load.

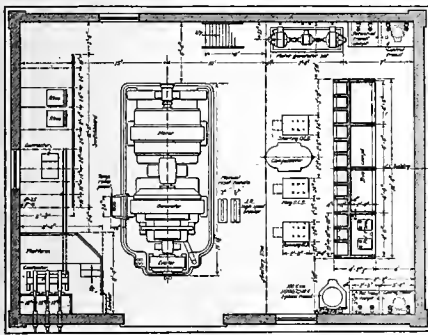


Fig. 4. Floor plan of Key System automatic substation.

Constant voltage is maintained on the station d.c. bus for all loads up to and including the 300-per-cent load, provided the temperature limit of the machine has not been reached.

Temperature relays control the duration of overload according to the temperature of the machine. For example, assume a load demand which throws a 300-per-cent load on the machine. Under this condition the machine will pick up this amount of load and carry it until the temperature rises to a predetermined value, at which point a thermal relay operates and automatically causes the machine load to drop to 150 per cent. If the current remains at the 150-per-cent point until the machine temperature rises to a second predetermined value another thermal relay acts to cause the load on the machine to be reduced to 100 per cent. If conditions are such that the generator temperature continues to rise with only 100 per cent load on the machine, a third thermal relay will operate to shut down and lock out the machine. This latter step is designed in this way because only under some abnormal condition will the machine temperature continue to rise with only 100 per cent load on the machine.

Another condition that is met by the apparatus is that if, after the machine has been limited automatically to the 150 or the 100-per-cent load, the temperature of the machine drops sufficiently the control apparatus will operate to permit the machine again to pick the next higher step of load until temperature values of the generator again cause a restriction as described in the above paragraph. In this way varying conditions are met by the

equipment in such a way as to protect the equipment and at the same time meet the maximum power demands during the heaviest peak-load periods.

Control of the machine at the present time is effected through an Anderson time switch. This switch now is set to take care of the normal daily peak demand periods, from 6:15 a.m. to 9:45 a.m. and from 4:45 p.m. to 7:45 p.m. Load regulation during the periods of machine operation is as described in the foregoing paragraphs.

Emergency remote control is provided whereby the machine may be cut into operation at times other than those normally handled by the time switch. Control wires are strung from the station out to the pier terminal dispatcher's office. By means of these the dispatcher at will may cause the motor-generator to start up, come on the line, and take care of any unusual power demand that might arise. Stopping of the machine also may thus be controlled. The apparatus is so arranged that, should he so desire, the dispatcher may start the machine over the remote control and hold it in operation until the time that the time switch normally would start the machine and then cut off his remote control and leave the machine operating on the time-switch control, to be shut down by the switch at the predetermined time. In a similar manner the dispatcher may cause the machine to continue to operate after the time switch normally would cause the machine to shut down.

### Voltage Regulation

A small motor-generator set provides voltage regulation. This set is arranged to boost or buck the field of the main d.c. generator, depending upon the excitation of the boosting and bucking fields of the small regulating generator. The boosting field is connected continuously to the 125-volt control-power generator and the bucking field is connected so that it may be shorted out by one of the automatic contactors when conditions warrant.

This combination is controlled by the potential-balancer relay, one coil of which is connected across the machine potential and the other coil of which is connected across the bus potential. While machine voltage is below that of the bus the relay operates to maintain the bucking field shorted out by the aforementioned contactor. When the machine voltage rises to a value 5 per cent above that of the bus the balancer relay operates to permit the cutting in of the bucking field on the control generator, acting to reduce the machine voltage. Through this action the machine voltage is maintained at a value about 5 per cent above that of the bus. A set of relays connected across the regulating generator act to prevent shunting; the relays operating at a frequency comparable to that of a Tirrill regulator.

### High-Speed Breakers

Two JR high-speed breakers are connected in parallel in the negative lead of the main generator; each is bridged by a resistance. Under short-circuit conditions these breakers open to the limit of travel in 0.015 sec., cutting in protective resistance. This resistance reduces the current to a value within the commutating value of the gener-

ator. The operation of the high-speed breakers causes the opening of the bus breaker on the positive side of the machine.

### Protective Features

The equipment is capable of operating automatically to provide against:

1. Overspeed.
2. A.c. undervoltage.
3. A.c. overload.
4. Motor field failure.
5. Overheated bearings.
6. Wrong polarity.
7. Single and reverse phase starting.
8. Overheated a.c. machine windings.
9. D.c. reverse power and underload.
10. D.c. overvoltage.
11. D.c. ground or flash-over.
12. D.c. undervoltage.
13. Single, unbalanced or reverse phase operation.
14. Undervoltage connection to the d.c. bus.
15. Sudden increase of feeder current.
16. Reclosing feeder on short circuits or severe overload conditions.
17. Overheated d.c. machine windings.

Load regulation is accomplished through the devices operating according to the temperature of the d.c. windings.

### Copper Saving

Addition of this station permitted the removal of \$11,000 worth of copper feeder cable; decreased the feeder losses in this particular section from 22 per cent to 9.6 per cent; raised the operating voltage available to this section of track, increasing train speeds; and increased the track capacity in this congested territory by 11 per cent. The station has been in operation but a short time but already has demonstrated its ability to meet all design requirements.

The installation was designed and performed under the general direction of H. P. Bell, the chief engineer of the transit company. F. M. Morgan, the construction engineer of the company, had complete field charge of construction and erection work.

### Indoor Regulators for Outdoor Substation Jobs

By G. A. FLEMING, Engineering Department, Southern California Edison Company, Los Angeles.

Frequently it is desirable to install an induction-type voltage regulator cut-of-doors when only indoor type units are in stock or readily available.

The Southern California Edison Company has met this problem by designing a metal cover that will fit the 3-phase regulators of different manufacturers. The illustrations show two types or sizes, one for 4-kv. regulators, the other for 11-kv. or 15-kv. use.

The regulators in the 4-kv. installation form the heart of a small and very simple substation that has been developed to care for relatively unimportant loads in new or rapidly growing districts. The equipment is all in accordance with system standards and the layout is so simple that it can be erected quickly and then moved with small loss when the load justifies a more permanent and reliable type of station. For installations of this character it has been especially desirable to use regulators from stock even though they were of the indoor type.

The illustrations show the manner of carrying the conductors through bushings in the cover and also the general type of the cover used. The

upper part is sheet-iron with louvres on the side and the lower part is of screen to provide ventilation for cool-



Fig. 1. Typical installation of indoor regu-  
lator for outdoor service, Yucaipa substation,  
Southern California Edison Company.

ing. The contact-making voltmeter and compensator coil are mounted in the housing provided for meters. The 11-kv. regulator shown is to control one of a group of feeders. The rack is arranged to allow the installation of a regulator on any circuit with a minimum of work. Each regulator

is a unit by itself and may be cut in or out by means of a rather unique arrangement of the two single-throw disconnecting switches shown above the regulator. By operating the blade of the righthand switch as though it were a double-throw unit the regulator is cut out and by-passed.

### Explosives Used to Dig Pole Holes Economically

By J.R. CRAVATH, Consulting Engineer, San Francisco.

Pole-line extensions on the property of the Giant Powder Company, Giant, Calif., presented an opportunity to try out the blasting method of digging pole holes. The occasion of the extensions was the establishment of a black-powder plant on the company's property, the precautions incident to such a plant necessitating its location remote from existing plants. The line job afforded a chance to try the blasting method on a somewhat larger scale and under more favorable conditions than generally have existed heretofore where blasting for power-line poles has been practiced.

About 45 holes were so blasted on this job. The location of the lines is in a large field near San Pablo Bay, and the soil at the time the work was done was baked very hard. The soil was practically free from rock and small stones and there were no water pipes or other underground construction to avoid or preserve.

Adobe soil such as this and when dried out as this was is very hard digging. The contract for the electrical construction of the black-powder plant was let to the Pioneer Electric Company of Richmond. It was con-

templated originally to dig these holes by hand, but the allowance the contractor was willing to make for the omission of hole-digging was sufficient

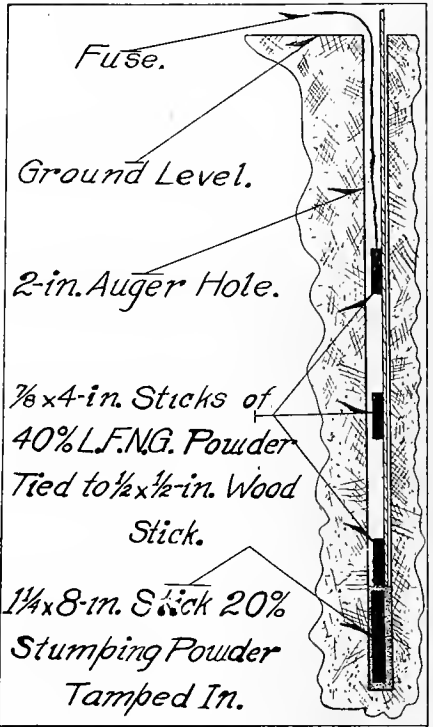


Fig. 1. Sketch showing placement of one whole stick and three half sticks of explosive to prepare 6-ft. hole in adobe soil.

to induce the Giant Powder Company to take back this part of the work and do it by blasting. The net result is considered by those connected with the

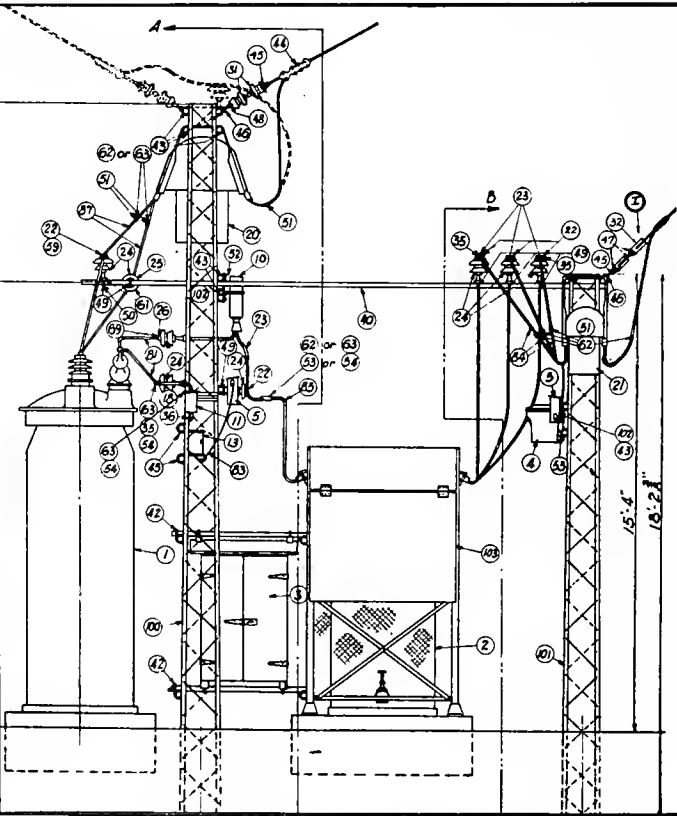


Fig. 2. Design details of 4-kv. outdoor installation of indoor regulator, Southern California Edison Company.

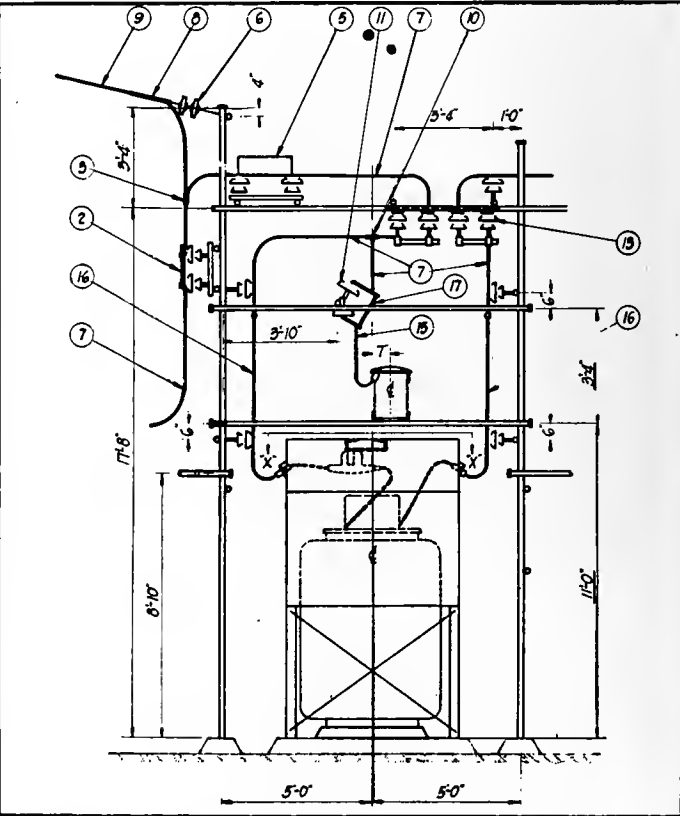


Fig. 3. Details of 11 and 15-kv. outdoor installation of indoor regulators, Southern California Edison Company.



work to have been a considerable saving over the other methods which were feasible for this job. Therefore, the method should be of interest to all who are doing work under similar conditions.

The following method was used. A 2-in. hand auger was used to bore a hole to a depth of 5 ft., as shown in Fig. 1. Sticks of dynamite then were tamped in or tied to a wood stick and sunk into the hole as described later so that the proper amount and kind of dynamite was placed at the proper depths from the surface. At the bot-



Fig. 2. Appearance of ground surface after explosion; ground loosened.

tom end of the hole was tamped a 1 1/4 x 8-in. stick of 20-per-cent L. F. stumping powder. Sticks of 40-per-cent L.F.N.G. powder measuring 7/8 x 8-in. were cut in half and three of these half-sticks 7/8 x 4 in. were tied to the wood stick at 9 in. intervals about as shown in Fig. 1. A cap was placed in the top stick with a fuse long enough to reach to the top of the ground.

It will be seen that most of the explosive was considerably below the



Fig. 3. Completed hole as finished with only a shovel and a post-hole digger.

surface of the ground. As a result, when the charge exploded very little dirt was thrown up. A little heap of loose dirt or sometimes simply a patch of loose dirt level with the ground was all that marked the place where an explosion occurred, as shown in Fig. 2. This loose dirt at the surface was removed easily with a shovel. Below it

were found a series of pockets where the four powder sticks had forced outward the dirt opposite each. Between these pockets was loose dirt which also was taken out easily with a shovel and a post-hole digger. Figure 3 shows a completed hole. Pockets were not all the same size. The slow powder at the bottom blew a pocket about 18 in. across while the three pockets above it were about 12 in. The openings between pockets, being in loose dirt, naturally varied in diameter.

For soil conditions like those described and with a limited number of holes to be dug the process has proved very economical. One experienced powder man and two helpers can sink the auger holes, fire the shots and clean up ready for setting poles at the rate of four holes per hour. About ten cents worth of powder is required for each hole. The holes on this job were mainly for 30-ft. poles.

This method seems to have a certain field in which it has advantages over the other two common methods of digging; that is over hand digging and machine digging. Where a large number of holes are to be dug on one job in an accessible place the digging machine with its pole-erection features offers the lowest cost when the combined processes of digging and erecting are considered. Blasting undoubtedly is cheaper than hand digging. Its limitations are that it cannot be used near underground pipes, ducts or foundations. On occasional, scattered jobs, the amount of work at one place may not justify the precautions necessary in the transportation, handling and use of explosives. Also in some soils where large stones are likely to interfere with the use of the hand auger in boring for the placing of the charge the blasting process is shut out. The noticeable effect of the explosion extends about 2 ft. through the ground outside the hole and probably it is unwise to use charges of the kind herein described within 4 ft. of pipes or foundations. Outside of the limitations named there appears to be a considerable field for this method.

Switch Safety Tags Provide Permanent Record


By W. C. FOSTER, Assistant Operating Engineer, Portland Electric Power Company.

Safety is engendered by the Portland Electric Power Company through the use of standardized tags for labeling switches out of service for repairs. Switches on any line or equipment opened and ordered held for workmen are tagged in the station by the station operator with a special red tag. The front and reverse sides of this tag are shown in Figs. 1 and 2. It may be noted that on one side of this tag is space providing for a complete cycle of operations for a switch. This gives the names of all involved in the transaction and serves as a permanent record thereof.

When the switch finally is ordered cleared and closed the operator notes on the tag this final information and then sends the tag to the office of the operating engineer for inspection and filing.

Pole-top switches are tagged in a similar manner with a large red metal tag. On this tag are the words "Hold

Form 493



SWITCH CARD

PORTLAND RAILWAY, LIGHT AND POWER CO.

Mr. O'Dell is

working on 11645

At Alder

Switch on 11645

At Sub Sta. Alder

Ordered opened by James

11:58 A.M. Date 9-30 1925

Switch opened by France

11:59 A.M. Date 9-30 1925

Switch ordered closed by James

12:36 P.M. Date 9-30 1925

Switch closed by France

12:37 P.M. Date 9-30 1925

Remarks

Fig. 1. Face of switch tag.

Switch Open." The tag is placed by the lineman opening the switch.

In the dispatcher's office another tag is used to give an indication on the system diagram that is parallel to that given at the switch by the fore-

Form 493

HOLD THIS SWITCH

OPEN

BY ORDER OF

LOAD DISPATCHER

Instructions

This card must be attached to apparatus and properly filled out and signed by persons opening and closing switch, as provided by the laws of the State. Send this card to Load Dispatcher as soon as circuit or apparatus noted has been cleared and switch closed.

Fig. 2. Reverse of switch tag.

going tags. This tag, shown in Fig. 3, is pinned to the system diagram at the point representing the switch in question. It bears such information



Fig. 3. Tag used on dispatcher's board to indicate special conditions at definite locations. Typical application of grounded-feeder indicator.

as will identify the condition prevailing. This same tag is used to indicate to the dispatcher all special conditions on the system that might affect operation.

# IDEAS FOR THE CONTRACTOR

## Electrical Estimating for the Contractor—XIV

### Continuing a Study of the Uses for Conveyors and Power Chains and Giving Formulas to Estimate Problems

By J. R. WILSON\*, Quality Electric Works, Los Angeles

#### Elevators and Conveyors

In the design of modern industrial plants first consideration always is given to the routing and handling of the materials to be fabricated. Anything which tends to decrease the necessity of employing a large amount of "common labor" also tends to decrease "labor turnover." It is a fact well known in industry that "common labor" is one of the most unstable and unreliable commodities with which plant managers have to contend.

Mechanics who have spent years in learning their trades are not so prone to sever their connection with a firm if the working conditions are at all satisfactory. But the "floating element of common labor" cannot be depended upon, no matter how desirable the working conditions may be made.

In these days of machinery and high-speed production a plant designed along those lines soon would be in the hands of a receiver. The modern demand for speed in production has been met by the use of conveying and elevating machinery, and some types of this equipment have been developed to a wonderful degree of efficiency.

The use of conveying and elevating machinery usually is specified in the layout of any modern plant, regardless of the nature of the product. Typical examples of some of the industries in which this type of equipment is depended upon largely for doing the heavy work are ice plants, sand, gravel and rock plants, packing houses, flour mills, mines, paper mills, power plants, sugar factories, glass plants and canneries.

this line. But with the previously mentioned desire for speedy production many managers of the older plants now find themselves unable to meet present competition. Their only hope in order to stay in business is to modernize their plants to the extent within their means.

Keeping in mind the statements previously made here, it readily will be seen that the logical method is first to consider ways and means of reducing the costly handling of the raw and finished product. The estimator who is equipped to make recommendations and to carry them out to a successful

Table A

Working Factors for Malleable Iron and "EC" and "SS" Class Steel Chains

Number of Teeth	Chain Speeds—Feet Per Minute							Number of Teeth	Chain Speeds—Feet Per Minute						
	100	200	300	400	500	600	700		100	200	300	400	500	600	700
6	7.0	9.0	14.0	20.0	...	...	...	29	5.3	6.3	8.5	11.6	14.1	17.2	20.3
7	6.6	8.5	12.8	18.0	...	...	...	30	5.2	"	8.5	11.5	14.0	17.1	20.2
8	6.4	8.2	12.0	17.0	25.0	...	...	31	"	"	8.5	11.5	13.9	16.9	20.1
9	6.1	7.8	11.5	16.0	22.0	...	...	32	"	"	8.4	11.4	13.8	16.8	19.9
10	5.9	7.5	11.0	15.4	20.6	...	...	33	"	"	8.4	11.4	13.7	16.7	19.7
11	5.7	7.3	10.5	14.9	19.6	25.0	...	34	"	6.2	8.4	11.3	13.6	16.6	19.6
12	5.6	7.1	10.2	14.4	18.8	23.4	...	35	"	"	8.4	11.2	13.5	16.5	19.5
13	5.5	7.0	10.0	14.0	18.2	22.3	...	36	"	"	8.3	11.1	13.4	16.4	19.4
14	5.4	6.9	9.8	13.7	17.7	21.5	27.0	37	"	"	8.3	11.0	13.3	16.3	19.3
15	5.3	6.8	9.5	13.4	17.2	20.9	25.4	38	"	"	8.3	10.9	13.2	16.2	19.2
16	"	6.6	9.3	13.2	16.8	20.3	24.5	39	"	"	8.2	10.9	13.1	16.1	19.1
17	"	6.6	9.2	12.9	16.4	19.9	23.7	40	5.1	6.1	8.2	10.8	13.0	16.0	19.0
18	"	6.5	9.1	12.7	16.0	19.4	23.1	41	"	"	"	10.7	12.9	15.9	18.9
19	"	6.5	9.0	12.5	15.8	19.1	22.6	42	"	"	"	10.7	12.8	15.8	18.8
20	5.3	6.5	9.0	12.3	15.6	18.8	22.2	43	"	"	8.1	10.6	12.7	15.7	18.7
21	"	6.5	8.9	12.2	15.3	18.5	21.8	44	"	"	"	10.5	12.6	15.6	18.6
22	"	6.4	8.9	12.1	15.2	18.2	21.6	45	"	"	"	10.4	12.5	15.5	18.5
23	"	"	8.8	12.0	15.0	18.1	21.3	46	"	"	"	10.3	12.4	15.4	18.4
24	"	"	8.7	11.9	14.8	17.9	21.1	47	"	"	"	10.2	12.3	15.3	18.3
25	"	"	8.7	11.8	14.7	17.7	20.9	48	"	"	"	10.2	12.2	15.2	18.2
26	"	"	8.6	11.7	14.5	17.6	20.7	49	"	"	"	10.1	12.1	15.1	18.1
27	"	6.3	8.6	11.7	14.3	17.4	20.5	50	5.0	6.0	8.0	10.0	12.0	15.0	18.0
28	"	"	8.6	11.6	14.2	17.3	20.4								

In the days before the invention of so much labor-saving machinery the handling of the incoming raw materials and finished product between the receiving department, the machines, and the shipping department was dependent wholly upon "common labor." Hand-trucks and wheelbarrows played a large part in the scheme of plant operation, and the propelling force was furnished by the muscles of laborers.

In fact, there is hardly an industry which can be mentioned in which this type of equipment would not show a decided saving in cost of production. Mechanical engineers recognize this fact and their recommendations for the use of modern handling equipment are limited only by the amount of money their clients have to spend on this item.

Therefore, the electrical estimator who receives a set of plans for a modernly designed plant will not be required to make recommendations along

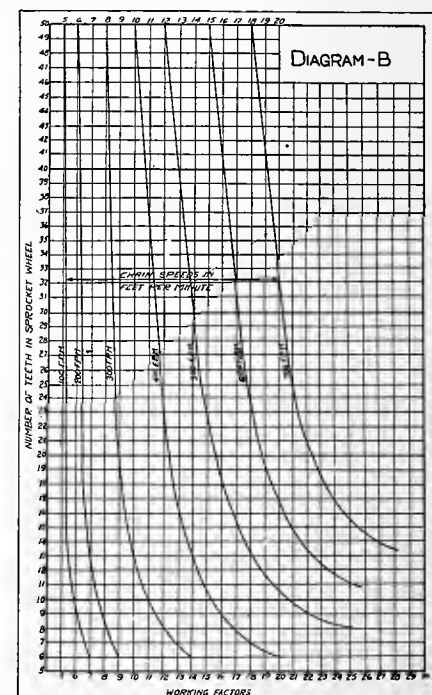


Diagram of Working Factors

conclusion has an opportunity of acquiring a great deal of additional business for his firm.

This field is so large in any industrial district that no estimator is justified in saying, "There ain't no business." The business is always there—for the man who will go out after it. The prospective customer may not be able to spend the money at the time figures are presented to him but the seed sown will give him food for thought and will bear fruit at the time least expected.

With the above thought in mind certain tables and data pertaining to this type of equipment are presented in this article with the hope that they will prove of value to those estimators who desire to enter this field but have not had experience along this line. Time can be very well spent also in inspecting modern plants which make use of conveying and elevating equipment. Any additional information re-

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Reference Table C

Diameter in Inches Expressed in Feet of Circumference  
(Diam. in Inches x .2618 = Circum. in Feet).

Diameter Inches	Circum. Feet	Diameter Inches	Circum. Feet	Diameter Inches	Circum. Feet	Diameter Inches	Circum. Feet	Diameter Inches	Circum. Feet
1	.26	21	5.50	41	10.73	61	15.97	81	21.21
2	.52	22	5.76	42	10.99	62	16.23	82	21.47
3	.79	23	6.02	43	11.26	63	16.49	83	21.73
4	1.05	24	6.28	44	11.52	64	16.76	84	21.99
5	1.31	25	6.55	45	11.78	65	17.02	85	22.25
6	1.57	26	6.81	46	12.04	66	17.28	86	22.51
7	1.83	27	7.07	47	12.30	67	17.54	87	22.78
8	2.09	28	7.33	48	12.57	68	17.80	88	23.04
9	2.36	29	7.59	49	12.83	69	18.06	89	23.30
10	2.62	30	7.85	50	13.09	70	18.33	90	23.56
11	2.88	31	8.12	51	13.35	71	18.59	91	23.82
12	3.14	32	8.38	52	13.61	72	18.85	92	24.09
13	3.40	33	8.64	53	13.88	73	19.11	93	24.35
14	3.67	34	8.90	54	14.14	74	19.37	94	24.61
15	3.93	35	9.16	55	14.40	75	19.63	95	24.87
16	4.19	36	9.42	56	14.66	76	19.90	96	25.13
17	4.45	37	9.69	57	14.92	77	20.16	97	25.39
18	4.71	38	9.95	58	15.18	78	20.42	98	25.66
19	4.97	39	10.21	59	15.45	79	20.68	99	25.92
20	5.24	40	10.47	60	15.71	80	20.94	100	26.18

To find the required pull (or working strength) in the chain, use the formula:  
Chain Pull in Pounds =  $\frac{\text{Horse Power} \times 33,000}{\text{Chain speed in feet per minute}}$

quired always can be obtained from the manufacturers of such equipment.

Most of the different types of this machinery consist basically of sprocket wheels, chains and buckets, or drive wheels, rollers and canvas, rubber or leather belts. To make an intelligent estimate of probable saving to be expected by installing the necessary equipment, and the cost of such installation, the estimator must obtain reliable information regarding several factors. These may be stated as follows:

1. Typical characteristics of materials to be handled—sizes of largest and smallest pieces or articles, and weights per package or cubic foot.
2. Capacity—total quantity handled per working day and maximum hourly rate.
3. Points and manner of delivery to conveyor and discharge from it.
4. What parts of the supporting structure, hoppers, bins (or other appurtenances to the actual machinery), are to be included in the estimated cost of the installation.
5. If driven by separate motor, what horsepower and speed? If driven from a present line shaft, what speed and diameter?
6. Will customer furnish labor for erection (under contractor's supervision), or must contractor furnish all labor?

Always make at least rough sketches (on the job) of such obstructions as are apparent. Put down such figured dimensions as it is possible to obtain. These data will prove of value later, when making the drawings for submission to the prospective customer.

If there is any question regarding any part of the installation have it settled before the contract is signed, or have a detailed statement regarding future disposal of the question. Attach this statement to the contract and have it separately signed by the customer. Have all working drawings signed by the customer and keep copy in your files until the contract is completed.

This in no way reflects on the honesty of the customer or of the contractor, but is a protection to both parties. It is purely business and is the procedure followed by all reputable architects and engineers.

To provide a logical sequence of discussion we will divide the conveying mediums into two classes: chain conveyors and belt conveyors, and consider the data pertaining to each class separately.

Power Chains

A chain must have two paramount qualities, durability and immunity from breakdowns. One well known manufacturer makes twenty-seven different types of power chains, each type designed to meet some specific condition of operation. The success of the installation depends absolutely upon the selection of the correct chain, also the chain must be run on sprocket wheels which fit it correctly.

The ratio, or "working factor" between the "ultimate strength" of a chain and the "working strength," "load," or "chain pull," depends upon the speed of the chain and the size of the wheels on which it runs. The engagement of each chain link with the tooth of the sprocket wheel is ended by a certain degree of shock, this being intensified as the speed is increased. On comparatively high speeds a chain of relatively higher ultimate strength should be chosen.

The number of teeth in a wheel affects the life and service of a chain in several ways. A chain is subject to:

1. Internal wear in the joint.
  2. External wear from contact with teeth and rim.
  3. Injury from shock or impact.
- Items 1 and 2 depend upon pull, speed, and number of teeth. Item 3 depends upon the chain pitch and wheel diameter, that is, the number of teeth.

For wheels of few teeth the safety factor must be higher to provide against the extra shock and wear. The impact of a link traveling 100 ft. per min. is 36 times as much as on an 8-

tooth wheel as on a 50-tooth wheel. The working factor for a chain running at 400 ft. per min, over a 6-tooth wheel is larger than for the same chain running 700 ft. per min. over a 50-tooth wheel and therefore requires a chain of greater strength to do the work. In comparing two chains of the same strength the one with the shorter pitch is preferable for driving purposes.

Table A and Diagram B give some valuable information pertaining to power chains and are authentic having been prepared by an authority on chains and their application. Table C will be found convenient for figuring chain speed in feet per minute from the diameter in inches. Table E gives the ultimate strength of some popular conveyor chains.

To find the working strength, divide the figures given in Table E by the working factors given in Table A or Diagram B; for instance, the ultimate strength of No. 77 chain is given as 3,600 lb. If the small wheel of the drive is 11 3/4 in. diameter and the speed is 100 r.p.m. the chain speed would be about 300 ft. per min.

If we assume a 16-tooth wheel, by reference to Table A we find the corresponding factor, at 300 ft. per min., to be 9.3. The proper working load,

$$\text{therefore, would be } \frac{3,600}{9.3} = 390 \text{ lb. If}$$

the same wheel were 6-in. diameter, 8-tooth, and made 200 r.p.m., the chain speed would be about 300 ft. per min., but the factor would be 12. The proper working load (for the same chain) would be

$$\frac{3,600}{12} = 300 \text{ lb.}$$

Always use the factor corresponding to the smaller wheel of the drive. Try to avoid the use of wheels having more than 50 teeth, or less than 10 teeth. Do not use a closer center distance for shafts than the sum of the diameter of larger and half the diameter of the smaller wheel.

To select a chain to transmit a given horsepower proceed as follows: knowing the r.p.m. of the shafts, assume wheel diameters which will furnish the desired speed ratio and an economical chain speed (not over 400 to 500 ft. per min.) Notice in Table A or Diagram B that the working factors increase rapidly below 12 to 16 teeth. Assume for the smaller wheel about this number of teeth, combine with a short pitch chain of proper strength, working out the problem as shown in the following examples.

Example 1

Transmit 4 hp. from 60 r.p.m. shaft to 20 r.p.m. shaft.

Trying 16 teeth for small wheel (to avoid a large working factor) and 48 teeth for larger wheel (as coming inside the 50-tooth limitation) we find the series of wheels for 2.609-in. pitch chains (Table E) gives a diameter of 13 1/4-in. for the small wheel and 40-in. of 208 ft. per min. The chain pull

$$\text{figures } \frac{4 \times 33,000}{208} = 635 \text{ lb., and the}$$

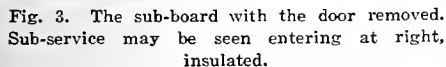
combination of chain speed and number of teeth calls for a working factor





## Unsafe Wiring Checked by New Form Used in Denver

On the main board, supplying 440-volt service,  $\frac{3}{4}$  x 4-in. copper bus, two pieces bolted together for each of three legs was used. The distribution system is operated at 110 volts, and here, too,  $\frac{3}{4}$  x 4-in. copper bus, three pieces bolted together, are used to distribute to the sub-board. At the main board



Altogether this plant has a connected load of approximately 1,100 hp. This includes two 300-hp. motor-generator sets.

One of the inspectors is detailed with one of the assistant fire chiefs from the fire prevention bureau to make a complete inspection of old buildings in a certain area. In checking over the building for all causes related to fire hazards, this form is brought into use when electrical items are encountered. It is made out in duplicate, and the original signed and checked by the in-

A green tag, warning against any additions, is used to identify overloaded circuits. "Do not make any additions to the installation until corrected" is the warning given by the tag.

Fig. 1. The new form used to indicate defective wiring and require correction as used by the city inspector of Denver, Colo.

# BETTER MERCHANDISING

## The Trade-in—What To Do With It

Used Appliance Problem Facing Electrical Industry Holds No Terrors  
for Merchandiser Planning to Meet it

What to do about trade-in appliances—the question which once agitated the automobile industry—is about to descend upon the electrical appliance merchandiser. But as in the case of the automobile, the problem has found its solution in a square facing of the facts and doing something about it.

It is not with any shouting of hosannas that the prospect of the used electrical appliance is regarded, to be sure. The presence of a necessity for disposal of trade-in or second-hand appliances presumes a certain saturation of the market which means downright hard work for the merchandiser. But it is equally true that it doesn't do to let the situation bluff anyone out of good sleep and three square meals a day. Ways have been found in the automobile business to solve the problem. And certainly, if any business has periodically faced saturation points row on row, in full marching order and armed to the teeth, the automobile industry has done just that.

Are they downhearted, the automobile builders? Not as long as the words "improved model" stand the wear and tear of automobile advertisements. This morning's paper announces that somewhere that some one of a dozen—if not all twelve—automobile manufacturers is or are about to start work on a new umpty-ump million dollar spare tire rack factory, just as if no saturation point existed. It doesn't exist for the automobile manufacturer.

The electrical appliance market need have no saturation point either if the industry wrestles with it and shows it which is a better man, the saturation point or the industry.

### Taking Away the Iron and Coffee Pot

Not long ago several electrical merchandisers found that they could sell a great many electric irons, percolators, and vacuum cleaners if they offered a dollar for the old sad iron, the old coffee pot, or the old broom or carpet sweeper, in trade for the electrical appliance which was to replace them. It isn't mentioned in any of the accounts of such sales campaigns just what the enterprising electrical man did with the accumulated sad irons, dirty coffee pots and old brooms after they had served as a spectacular window display. More than likely some enterprising junk man was sold a quantity of scrap iron, and the broom handles made good kindling.

But it hardly pays to sell for junk the old vacuum cleaner or the old

washing machine. As junk they bring too little to entice the thrifty housewife to part with them, even though a more modern machine could do the work more efficiently. To her they represent some outlay of capital that she would like to realize on the purchase of a new piece of apparatus. If the old machine can be turned in as part of the new investment, the first barrier of resistance is broken down, and the sale is half made. This is a fact that any good salesman knows from experience.

### If This Is So, What's To Be Done?

Obviously, if an electrical merchandiser wants to dispose of more new

factor already exists between manufacturers.

But the second consideration is left pretty much up to the electrical merchandiser. That is his problem, in almost every case. It is a test of his shrewdness as a merchandiser to develop some means of sliding the old appliances, out of the household and slipping the new one in gracefully. That is becoming part of the art of selling.

But, what he does with the old appliance after it has been taken in as part payment, "that is the question!" That is a question which requires not only salesmanship, but ingenuity as well as a long list of other pious qualities from forbearance down to tact and back again to diplomacy.

### The "Rebuilt" Idea Sells Many Things

Some years ago ingenious merchandisers of certain mechanical goods brought forth the idea of the "factory rebuilt" typewriter, adding machine, etc. Then the used car merchant caught the idea and produced guaranteed rebuilt cars. It is not uncommon to see advertised almost any type of mechanical apparatus that has been rebuilt and put on the market for the thrifty person who would save a little on the machinery he needs or wants. Even houses have been rebuilt recently and have found a good market.

One thing is accomplished by the rebuilt machine. Offering a standard piece of equipment, overhauled and worn parts replaced, and at a price somewhat lower than the price of a new appliance, the range of sale is extended from the class of people who are financially able to purchase such appliances to a much greater class, just on the edge, who would buy if they could get them at less cost. These people will eventually buy new machines, after they have tried and used a good rebuilt machine satisfactorily for some time. They are worth cultivating as future customers.

Already some electrical merchandisers are making use of this idea. The traded-in appliance is given an overhauling and touched up with paint. It is then exhibited in a department set aside for that purpose, where it will not compete with the new machine. It is sold with a guarantee based on its condition and merit, and goes forth backed by the merchandiser's good name.

Feeling that it must take in wood and coal stoves, gas ranges and oil stoves if it were to place a good load on its lines from electric ranges, The

### FOR SALE—MISCELLANEOUS

## Used Electric Ranges

ONE Universal cabinet range, 4-top burners, oven and broiler; cost new, \$175; used few months; will sell for \$100, balance due on account; to appreciate this range you must see it. RUTENBUR electric range, 3 top burners, elevated oven and broiler; good condition; last for years. \$65. WESTINGHOUSE range, semi-automatic electric range; cost new \$135; will sell for \$75; a real buy. Call and see it.

## Used Laundry Equipment

BLUE BIRD electric washer, good running condition, \$85. WATER POWER washer with wringer used short time; runs and looks like new, \$20. WATER POWER washer, good condition; works fine, \$15. A real bargain. COMBINATION hand wringer and tub stands; used one month, \$8. USED Hot Point vacuum cleaner, runs and cleans well, \$10.

## Blue Bird Electric Shop

1105 Broadway Main 3003.

A Tacoma electrical merchandiser uses the classified columns of the newspapers with telling effect in disposing of used electrical appliances.

appliances in a market already fairly well supplied with those appliances, he must have two things. These are:

(1) A product which presents an improvement on the existing appliance.

(2) A means of removing the existing appliance from the scene with the least pain.

The manufacturers supply the first consideration. New models are appearing with the frequency of new automobile designs. Great competition in this



An Exceptional Opportunity to Get a Vacuum Cleaner at a Very Low Price

100 Guaranteed Factory Rebuilt Electric Vacuum Cleaners \$18.45 for Wednesday Only

These cleaners go on sale tomorrow morning at 8:30. Be on hand early to get your cleaner; the last time we offered these rebuilt machines, they were sold out in short order. And no wonder, for they are the greatest values in vacuum cleaners on the market. You have a choice of well known makes—Hoover, Premier, Ohio, Apex and Eureka. Every cleaner has been thoroughly reconditioned—all worn parts have been replaced and each cleaner is fitted with a new bag. We have tested every machine to be sure it is in perfect running order.

Don't miss this opportunity to get a vacuum cleaner—and avoid the dust and work of sweeping with an old fashioned broom during the hot season. Only a small down payment is necessary with the balance spread out in small monthly payments.

May Be Bought on Easy Terms      Only One to a Customer

**Breuners**  
Sole and R. Streets  
OAKLAND      SACRAMENTO      STOCKTON

Choice of Such Well-Known Makes of Vacuum Cleaners as:  
Premier  
Eureka  
Ohio  
Apex  
Hoover  
Guaranteed Against Mechanical Defects

Rebuilt vacuum cleaners, sold with a guarantee, are disposed of effectively by a large furniture dealer. A big advertisement, reproduced above, was one of the effective sales helps in selling these trade-in appliances.

Washington Water Power Company, as a typical instance of what can be done by careful study and a little daring, devised a novel means of disposing of these trade-ins. (See Journal of Electricity, July 1, 1926, p. 23.)

**Coal and Wood Stoves Replaced by Ranges**

It took instruction of the salesmen on the appraisal value of old ranges of every type and make. At first the old ranges were brought in to the main office and put on display in the basement of the company's offices. Occasionally a salesman was able to dispose of one where he failed to sell an electric range. Advertisements run in local papers attracted many sales and for a while this method of disposing of them sufficed.

Occasionally a salesman got over-enthusiastic in appraising the value of an old range, however, in his effort to sell an electric range. The problem became more acute with the selling of greater numbers of ranges. The company found itself with a large number of antiques and no market for them. Some were in very bad condition, and it was decided to hire a man to put them in first class condition and then sell them with a year's guarantee.

**Repaired and Sold on Terms**

Arrangements were made to have the overhauling done on a time-and-material basis. The plan proved so successful that a scheme was worked out to give the entire business to the repair man to handle. He set up a separate store to dispose of these ranges. Salesmen now co-operate with him in setting values on ranges of various kinds taken in. The Washington Water Power Company pays him a fixed charge for cleaning and making repairs on each range. It also stands the cost of repair parts and allows him a 10 per cent commission for selling. He pays the store rent himself.

To sell the ranges he may extend terms without credit approval provided he gets 25 per cent down. If the customer cannot pay that much down he may take up the matter with the company's credit department, and if credit is satisfactorily established, terms are extended over a period not to exceed twelve months. All collections and billing are done through The Washington Water Power Company.

It is to be said for this plan that it works. It not only relieves the company of all responsibility in selling and delivering but it is claimed that it has

been the means of getting from fifteen to thirty dollars more for every range than could be secured previously.

**Plan Worth the Trying**

While the plan just outlined may not work equally well under all circumstances there is much of it that can be adopted in any rebuilt appliance sales plan. More than anything it shows that there is a way out if the electrical merchandiser gives the problem sober thought and takes it in earnest.

The used appliance can be a bother or it can be a source of double income—income from the sale of the new appliance and income from the sale of rebuilt appliance. It all depends upon the way it is regarded. It all depends on the way in which it is attacked and fought out.

The used appliance problem is one which requires above all else what is gracefully called "intestinal fortitude."

**"Double Action" Window Sells Washing Machines**

Action in a show window always will attract a crowd. And when there is double action there is likely to be a "double crowd." Such was the case, at least, when a northern power company put in a "double-action" display in one of its salesroom's show windows recently.

An electric washing machine was placed on a track in a 12-ft. window in such manner that the casters for the machine served as wheels. The wringer had a web belt, quite broad, running through it. Either end of this belt was attached to a frame that held the webbing at the right height.

On either side, the wringer trip was fastened to a string that was just long enough to permit the machine to glide to the end of the track when the string, fastened at the opposite side, drawn taut, would reverse the machine. The motor on the machine fur-



In its well lighted windows at its Sutter Street offices in San Francisco, the Pacific Gas and Electric Company recently exhibited this display of Savage washing machines, attracting a great deal of attention. This window-display feature is tendered to merchants of various lines of merchandise to demonstrate the effective use of daylight window lighting.

nished the power. All the time the washing machine was traveling back and forth on the track the wringer was in operation.

Two bull terrier dogs seated near the machine imparted the sales message. Said one, breather fashion, "It would sure be a dog's life to do without the Automatic Washer, hey, Beans?" The other replied: "Yes, and think of the good work and speed with which the Automatic does the washing!"

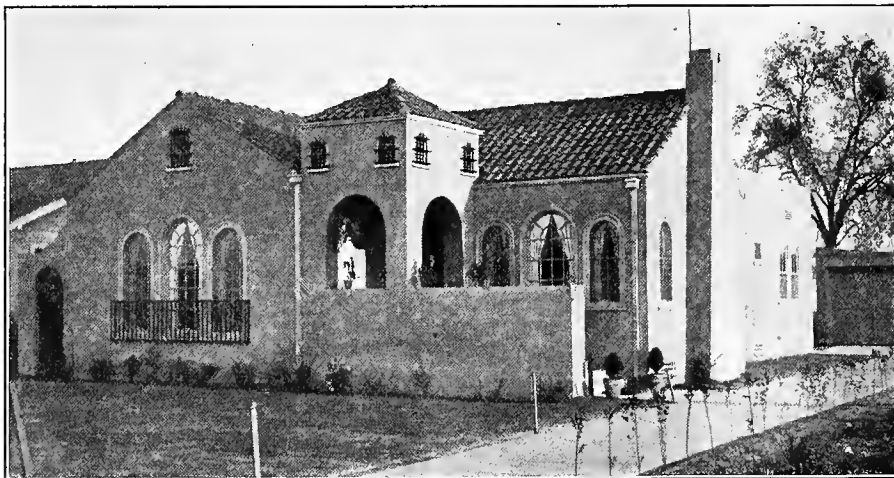
Sales the first day more than paid for the cost of the window out of the profits.

### Entire Community Helps to Make Electric Home Display

How A. R. Tanner, General Electric Company salesman located in Visalia, Calif., being himself convinced on the electric home idea, elicited the co-operation of central station, contractor, dealers, jobbers, music and furniture dealers in making the home he was building an electric home display, is an interesting chapter in the story of home electrification.

Deciding to build for himself, Mr. Tanner wanted that home to be thoroughly electrical. The idea occurred to him that he might get the co-operation of the entire community in making his home a model electric home, allowing it to be used as a demonstration of what the complete modern home should be. Although not interested directly in the sale of either electrical merchandise or homes, his work with the General Electric Company being in connection with other lines of material, yet as a member of the electrical industry Mr. Tanner said:

"I felt that I should open my home to the public and contribute what I could to the good of the industry by the education of the public along electrical lines. I have been well repaid by the appreciative attitude shown by those visiting the home."



Visalia, Calif., was given its first electric home demonstration when A. R. Tanner, salesman for the General Electric Company, opened his new home to public inspection in co-operation with the builders, contractor, power company and local furniture, piano and nursery supplies dealers.

The Southern California Edison Company completely furnished the kitchen and contributed the current used during the week of display. A range specialist was supplied by this company to demonstrate in the kitchen. The Visalia Electric Works, which did the wiring, furnished a number of appliances. Two members of the firm were in the home at various times to

explain the merits of electrical service to the visitors. Messrs. Wood and Deakin, furniture dealers, completely furnished the home and helped to entertain the visitors also. Wiley B. Allen Company placed in it an electrically driven Ampico piano, which with a Radiola superheterodyne kept the visitors supplied with music. A contralto soloist entertained one evening, too. The California Electrical

signs, cards, prices nor anything of a commercial nature was exhibited. Each person helping to entertain visitors tried to make them feel at home and tried only to show the advantages of the home electrical. There have been a number of electrical homes, but this is the first instance reported in which one was conducted by someone other than those directly interested in electrical merchandising or home building.



Animated billboard adopted by the Rocky Mountain Electrical Co-operative League to promote better wiring and lighting of homes in the Salt Lake region. The board stopped crowds of passing motorists, often blocking the street.

Bureau furnished the floodlights to illuminate the exterior of the house during the time of exhibition.

Other companies who contributed toward the exhibit, either in display material or in advertising were: K. C. Heath and staff, Fancher Creek Nurseries, Visalia Hohe Builders, Mobert Brothers, A. Dressler, and C. J. Allen, representative of the Pacific States Electric Company.

Co-operative advertising on the home display was run in the papers. During

### Animated Billboard Used by League to Sell Wiring

A distinct step forward in endeavoring to promote the "better homes" idea as related to more and better use of electricity in the home has been taken by the Rocky Mountain Electrical Co-operative League in the display of an electrically operated animated billboard. This board has been placed in operation on a much-traveled street in the southeast residential district of Salt Lake City. The board is of the vista or stage type, 10 x 30 ft., using three sets of colored lights, representing daylight, sunset and moonlight, thrown on an attractive setting comprising a high-class residence with appropriate surroundings. As the sunset changes to moonlight the interior of the house appears to become lighted up, all of the windows presenting a striking example of a well-lighted home, from an exterior view.

The lighting effects produced automatically, combined with the attractive setting, are producing excellent results, and the attention of practically every passer-by is drawn to the display. On the first night of operation, 232 cars stopped to watch it, and an average of 75 cars has been stopping each night since that time. Several times the streets have been blockaded as a result.

A very small amount of copy is used, as shown in the picture.

The board was constructed and placed in operation by the American Animated Sign Company, a Utah corporation.

**Electragists, Southern Division, report on June Wattage Sold.**—Reporting on wattage sold for June, 18 reports turned in to the secretary of the California Electragists, Southern Division, show that a total wattage of 120,614 was represented in appliances sold during that month.

the week of the display over 3,200 people visited Mr. Tanner's home. A number came from surrounding towns; the entire high school from one of the nearby towns came in a body to visit it one afternoon, and at other times individual classes from other schools visited the home.

No attempt was made to commercialize the demonstration. Neither



New Mexico Central Station  
Revamps Sales Room

Entirely rearranging its sales and office facilities about six months ago, when expansion of business necessitated additional room, The Albuquerque Gas & Electric Company, Albuquerque, N. M., has achieved distinction in its territory for its well arranged offices.

The arrangement is the personal idea of Arthur Prager, general manager of the company, and since July 1 president of the Rocky Mountain Division, N.E.L.A.

The color scheme is gray, even in the gray stain used on the oak cabinets and fixtures.

Electrical men attending the New Mexico convention last year agreed that the entire arrangement and especially the lighting was the best to be

found in any central station in the Mountain country.

The ceiling units are 300 watts mounted on 12-ft. centers. Mirrored glass window reflectors of 150 watts each on 12-in. centers are employed. The average intensity inside the display room is about 35 foot-candles while in the windows it is about 100 foot-candles.

At the right of the salesroom as it is entered, living-room furniture is employed. The purpose of this is not for appliance demonstration but for comfort and convenience to customers and is used especially as a meeting place.

The information desk is immediately available from the main entrance. It is in the center of the office and includes the company telephone switchboard. Indirect electric signs are utilized for each desk and division.

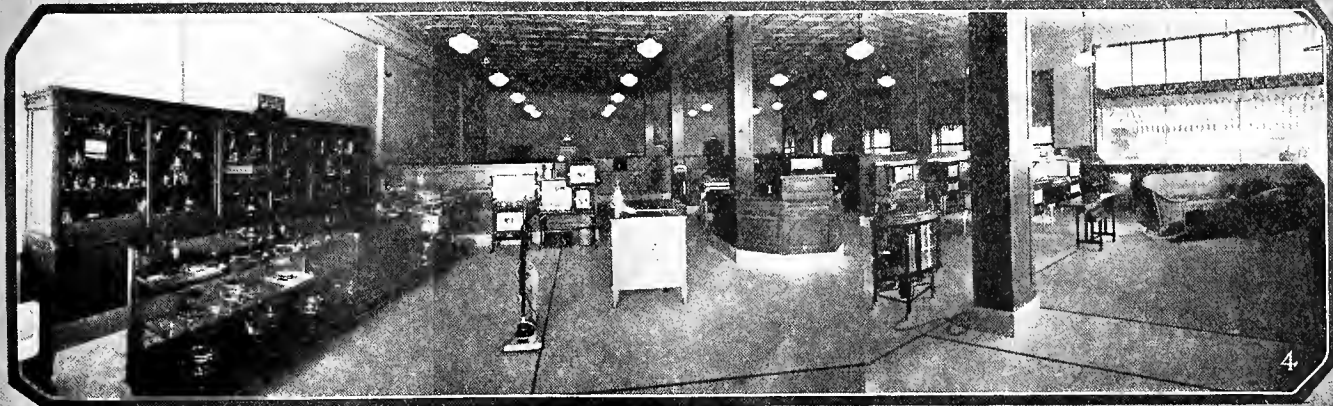
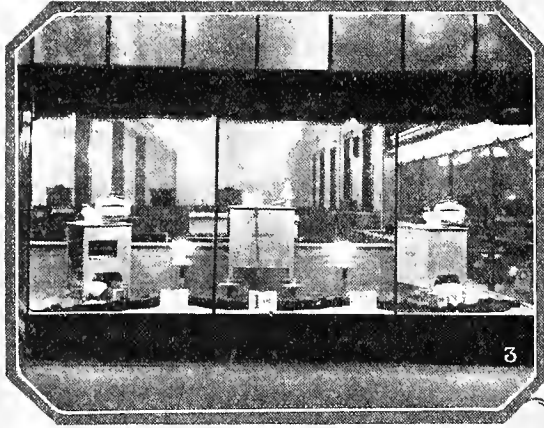
It is interesting to note that the company just recently started actively

to merchandise. Since the photographs were taken an incandescent lamp display has been added. Results have been very satisfactory in a commercial way, according to Mr. Prager.

**Central Station Industrial Heating School Completed.**—What is said to be the largest and most successful industrial heating school for central-station men ever held was carried on from June 14 to 26, inclusive, in East Pittsburgh, Pa. Representatives of central stations from all over the country studied the advantages of electric heat for industrial processes and the possibilities of the market from a central-station point of view under the leadership of Westinghouse engineers and sales representatives. In addition there were ten Westinghouse students, engineers and sales representatives, and one representative of an industrial concern.



A CENTRAL station that has made a success of merchandising is the Albuquerque Gas & Electric Company, Albuquerque, N. M. This company recently rearranged its entire office to conform with the needs of a growing section for service. Arthur Prager, general manager, conducted the rearrangement personally, and the results are such that he has received commendation from all who have visited the offices. (1) Shows the night illumination of the office and sales building. (2 and 3) Are the windows of the company office, attractively displaying electrical merchandise. The lower picture is a panorama of the store and office. The appliance sales department is to be seen on the left, with the business offices of the company at the center rear. At the right will be noted an attractive living room arrangement.



# NEWS OF THE INDUSTRY

## Brighton-Merced Tie-Line Important Link in California Interconnection

A great forward step in electric power development in California was celebrated with fitting ceremony Saturday evening, Aug. 14, when the Wilson substation at Merced was dedicated officially. This substation is the southern terminus of the 105-mile, 220-kv., steel-tower tie-line between the Great Western Power Company and the San Joaquin Light & Power Corporation, and the completion of this transmission line not only ties together the power resources of two of the largest operating companies on the Pacific Slope but it strengthens interconnection of systems throughout the length of California and makes possible interchange of substantial blocks of power from the Mexican border to the Oregon line.

Built with the thought of thorough and substantial state interconnection in mind the primary purpose of the line is to conserve water and fuel resources of the two interested companies, which are the Pacific Coast subsidiaries of The North American Company. The Western Power Corporation of New York, which had previously operated the Great Western Power Company of California, purchased in 1924 the control of the San Joaquin Light & Power Corporation. (Journal of Electricity, Dec. 15, 1924, p. 454.)

Subsequently the Western Power Corporation of New York became one of the allied properties of The North American Company, with H. P. Wilson of New York still retaining the presidency. (Journal of Electricity, Sept. 15, 1925, p. 222.) The tie-line and substation which have just been completed were projected by Mr. Wilson, in whose honor the substation was named.

The line starts at Brighton, near Sacramento, in the territory of the Great Western company. Approximately \$2,000,000 is represented in its cost with an additional \$750,000 invested in the substation. It permits

the transmission of electricity generated in the hydroelectric plants a distance of approximately 450 miles, with laterals distributing the current to an average width of 150 miles.

The Great Western Power Company serves the San Francisco Bay district and the cities, towns and farms of the Sacramento and Napa Valleys of northern California. Its auxiliary steam plants are located in the San Francisco Bay region and its hydro plants are in Plumas County where an enormous watershed, feeding the Feather River, runs its waters into Lake Almanor, greatest artificial power reservoir in America, with a capacity of 1,300,000 acre-ft.

The San Joaquin Light & Power Corporation, with its auxiliary, the Midland Counties Public Service Corporation, serves the San Joaquin Valley counties of Mariposa, Merced, Madera, Fresno, Tulare, Kings and Kern, and the Coast counties of Monterey, San Luis Obispo and Santa Barbara. Its hydro plants, twelve in number, are located along the rivers flowing from the Sierra Nevada into the valley, several of them stream-flow plants and others drawing their water from a huge reservoir in Crane Valley, 50 miles from Fresno. The steam plants, maintained for standby service, are located in Kern County, operated by natural gas from the oil fields.

The two companies have a combined connected load of 675,000 kw. and serve 165,000 consumers, but they have different classes of service. The Great Western company's principal service is in the San Francisco Bay district. The San Joaquin company carries a substantial industrial load, chiefly in the packing houses of the fruit-growing sections and in the oil fields, but its service is largely agricultural, with more than 9,000 farms connected to its lines. In consequence the peak loads of the companies come at different

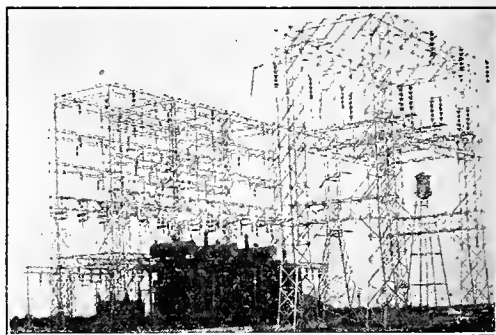
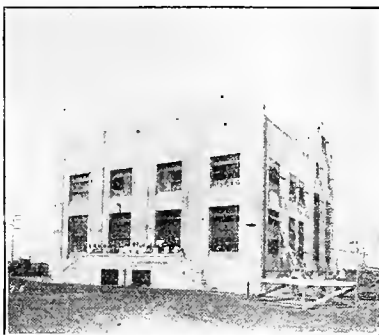
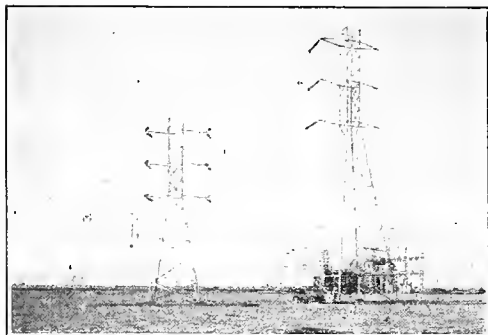
times of the year and the peak demands at different times of the day.

The dedicatory ceremonies were conducted in the presence of state, county and municipal officers from virtually every section of California, civic and industrial leaders and several hundred especially invited guests and stockholders of the two companies. It was a joint celebration, with chief features of the entertainment contributed by employees of the Great Western and San Joaquin companies. To Miss Maxine White of Bakersfield was accorded the honor of throwing the switch that set the power plant in motion.

Lester A. Ready, chief engineer of the California Railroad Commission, delivered the principal address of the evening.

"This transmission line becomes an effective connecting link between all of the electric utilities of northern California and those of southern," said Mr. Ready in part. "Its capacity at the present time of approximately 40,000 kw. is without question adequate for the present for all of the probable exchange of power which may be justified. It is susceptible of increase in capacity to serve fully for many years in the future. We can now say, in full truthfulness, that there is a complete interconnection of the power systems throughout the length and breadth of California. . . . What we are celebrating here tonight, and what justifies this dedication ceremony, is the practical accomplishment of the spirit of co-operation, fair treatment and of joint endeavor for mutual benefit, that this transmission line and substation are physical demonstrations of. This spirit of co-operation, of joining of forces for the mutual good, has been one of the secrets of the development of this great state of ours. . . . We are here dedicating more than anything else a useful manument to the continuing spirit of co-operation."

James B. Black, vice-president and general manager of the Great Western Power Company, and A. Emory Wishon, vice-president and general manager of the San Joaquin Light & Power Cor-



The newly opened Wilson substation of the Great Western Power Company, southern terminus of the tie-line between that company's system and that of the San Joaquin Light & Power Corporation, is of the most modern design and equipment. The three views reproduced show (left) the towers carrying the 220-kv. transmission line with bus structure in background, (center) the building which houses the condenser, and (right) transformer bank and bus structure.

poration, made brief addresses touching upon the significance of the new tie-line. Richard Shaffer, president of the Merced Chamber of Commerce, was master of ceremonies.

The outstanding features of the Wilson substation are the transformers which, according to the engineers of the General Electric Company, builder of all the machinery for the plant, are the largest in physical dimensions ever built, and the building which houses the condenser. Built at this time to accommodate two 25,000-kw. synchronous condensers, it is so planned as to permit of an addition of equal size giving enough space for two more condensers with the necessary control and switching equipment.

### Pioneer Washing-Machine Maker Tours Pacific Coast

California ranks with Ohio and Pennsylvania as one of the leading washing-machine states in the Union in the opinion of John Rocke, pioneer washing-machine manufacturer, who is touring the Pacific Coast. Mr. Rocke, who organized The Meadows Manufacturing Company of Bloomington, Ill., twenty-seven years ago, is chairman of the board of directors of that company and chief engineer in charge of factory production.

In discussing the new model just announced by his company Mr. Rocke stated that \$15,000,000 worth of new machines had been sold in four weeks. At the present time the factory is producing 3,000 machines a month and expects to double that capacity in sixty days.

Mr. Rocke is keenly interested in conditions as he has found them on the Coast and is taking advantage of every opportunity to study the situation, with particular attention of course to the possibilities for the marketing of washing machines.

## Hoover Pleads for Broad National Program in Development of Water Resources

Speaking before the Columbia River Basin League in Seattle Aug. 21, Herbert Hoover, Secretary of Commerce, made a plea for "definite co-ordinated plans and organization for the development of our water resources." He declared the country had "wasted vast sums of public money under political pressure" and that the time had come to submerge local considerations and center on major engineering jobs that would fulfill a "great national design." Prior to his speech Secretary Hoover had made a survey of the proposed Columbia River Basin irrigation project. Of the development of the Columbia River Basin he said:

The Columbia River Basin should be embraced in a national program of major water improvement. In the upper stretches of this river there are two and one-half million horsepower and there is a possibility of adding 1,750,000 acres of land to intensive cultivation. This project involves interstate questions affecting the interest of four states. It involves the creation of large storage, the regulation of the flow of the river, and the proper and systematic location of dams for reservoirs and power. And there is here again conflict over all of these matters. Above all, in this situation, too, a co-ordinated program, definitely determined, that can be hewn to over a term of years, is the need of this moment.

Touching upon the Colorado River, Mr. Hoover said that "a great dam at Boulder Canyon and subsidiary works

### Select Site for Dam for Second Unit of Skagit Project

The site for the 350-ft. masonry dam at Diablo Canyon, to be built at an estimated cost of \$2,800,000 by the city of Seattle as a second unit in the Skagit River hydroelectric project, has been decided upon, according to a recent statement of J. D. Ross, superintendent of the light department. The determining factor is a bed of hard granite 35 ft. below the surface of the river and extending for more than 400 ft. along its course.

Work will start as soon as materials and equipment can be moved to the site, this depending upon the completion of the railway extension from Gorge Creek, about  $4\frac{1}{2}$  miles. The city council utilities committee has recommended that the railway work, which will cost \$350,000, proceed at once.

### City Must File Answer in Suit Brought by Power Company

A demurrer filed by the city of Los Angeles in the suit recently brought against it by the Southern California Edison Company to recover judgment for a power bill amounting to \$840,154.96 which the plaintiff alleged is overdue and which the city has failed to pay has been overruled by Judge Ira Thompson of the superior court. In the original complaint filed June 15, 1926, the Edison company simply alleged the gross amount of indebtedness, and the significance of the action taken by the superior court was that the company will not be obliged to set out in detail the character of its claims. As a result of the ruling the city now will be obliged to file an answer.

Details of the original complaint were published in the Journal of Electricity, July 1, p. 31.

is clearly an urgent and immediate necessity." He continued:

It is one of the major water developments before us. I believe that in this case the entire outlay can be recovered from the sale of power and water. Many other great steps will need to follow because there must be a score of great dams before the whole of the Colorado Basin is developed and they may well require a whole generation for their completion. But above all, there must be a full co-ordination of development, so that any part undertaken whether by the government, by power companies, by the states, or by the municipalities, or the irrigation districts, shall be part of a complete scheme whose full realization will result in the maximum utilization of the river.

When electrical power is involved in the development of water resources the problems become more complex, the secretary declared. He went on to say:

It is my own view that the federal government should not go into the business of either generating or distributing electrical power. There may be some special cases, but our general policy should be against it. Where power is a by-product of dams for other major public purposes such as navigations, etc., then the federal government should lease the power rights so as to recover as much or the whole of its total investment as can be. Where the development is for power only then it should be leased under provisions of the Federal Water Power Acts which amply provide for control by the government. Where such major electrical development may in minor part affect the other purposes of irrigation or domestic water storage, etc., then the rights of these users can be protected by conditions in the leases and those acts.

### Price Reduction Announced on All Frigidaire Lines

Made possible through quantity production and increases in output planned for 1927, price cuts ranging from \$20 to \$90 were announced Aug. 10 by the Frigidaire Division of the Delco Light Company, Dayton, Ohio. The price cut affects Frigidaire metal cabinet models, residential and commercial installations and also cooling units designed for use in the standard makes of ice boxes.

The company maintains a permanent engineering and research department of 150 men, and this department, through simplification of designs and methods is credited by E. G. Biechler, president and general manager, for part of the savings in production which are reflected in the price reduction.

At the time of the price reduction the company had sold more than 200,000 electric refrigerator units. The factory schedule calls for an output of 600,000 refrigeration units next year.

Satisfactory progress is being made in the expansion program for the \$20,000,000 Frigidaire factory, whose increased facilities are to be available for production early in 1927. Contracts have been let and work started on additional buildings which are being constructed under private contract, supervised by construction engineers of the General Motors Corporation. The new buildings will be completed early in October, which will give plenty of time for installation of machinery by the end of the year.

### Utility First-Aid Methods Save Two Girls from Drowning

First-aid methods as taught in the safety department of the Pacific Gas and Electric Company recently resulted in saving two girls from death by drowning. Both young women, members of a party swimming in the Feather River at Bidwell Bar, Calif., were rescued and brought ashore unconscious.

Ivan Wright, member of one of the first-aid teams of the company's Colgate Division, took charge of the situation. Directing another young man, Herman Cochrane, how to work on one of the girls to restore respiration, Mr. Wright worked over the other. After six minutes one was restored to consciousness and in ten minutes the other was breathing again.

In reporting the incident the Marysville Democrat concluded with this significant paragraph: "In the Bidwell Bar emergency Wright was the only one in the whole party who knew what to do to restore life to a person under such circumstances, and without his presence the two girls would have been given up as dead."

### Industrial Consumption of Electricity.

—Although only 54 per cent electrified, the iron and steel industry leads in the consumption of electrical energy. Textiles come next; their electrification is 56 per cent. The other industries follow in the order in which they consume electrical power, together with their percentages of electrification: food, 60 per cent; lumber, 31 per cent; paper, 57 per cent; chemicals, 60 per cent; stone, glass and clay, 59 per cent; transportation, 87 per cent.



## Longest Multiple-Arch Dam in the World Is Completed by Edison Company

Completion of the Florence Lake dam across the south fork of the San Joaquin River by the Southern California Edison Company was announced Aug. 14. This dam, which crosses the river just down stream from the northern portal of the Florence Lake tunnel which was completed in February, 1925, has a crest measurement three-fifths of a mile in length and is the longest multiple-arch dam in existence. Its construction will create a lake which will rival Huntington Lake in size and beauty, having a circumference of nine miles as compared with fourteen miles of shore line around Huntington Lake.

The excavation for the Florence dam was commenced in the fall of 1924. The first concrete was poured in March, 1925, and pouring continued during the

the existence of a natural ridge of rock more than one-quarter of a mile in length standing approximately in the center of the dam site, and have extended the dam structure out from the sides of the valley to meet the two opposite ends of this ridge. The rock thus forms a part of the dam itself, and enabled the company to effect considerable economies in damming the stream.

In preparing the 950 acres which comprise the floor of the reservoir it was necessary to cut a large number of trees. A saw mill was erected on the ground and the trees were converted into lumber which was used in the construction of the forms for the dam.

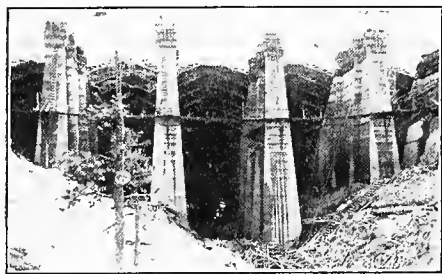
### Spokane Lumber Company Plans Power Development

Applications for the appropriation of approximately 200 sec.-ft. of water from Little Spokane River and nearby creeks for the development of electric energy have been filed by the Spokane Lumber Company with the state supervisor of hydraulics, Olympia, Wash. Permission also was sought for the formation of two reservoirs to store 9,780 and 1,850 acre-ft. of water, respectively.

The power, quantity of which has not yet been determined, will be used in mining and also offered for sale to other utilities, while most of the water diverted would be used for irrigation in the vicinity, it was stated. Cost of the project is estimated at \$210,000.

The Spokane Lumber Company now owns and operates dams at the outlet of Horseshoe Lake and Blake Lake which offer storage from the spring floods. It was pointed out in the application that now it is desired to release the water in uniform quantities so that the flow in the several streams to be used would be more or less uniform during the entire year.

**Two Applications for Licenses for Alaska Power Projects.**—The Home Power Company of Skagway, Alaska, has applied to the Federal Power Commission for license covering a proposed project in the Tongass National forest. The Sunny Point Packing Company of Seattle has applied for a license for a small power development near its cannery on Gunnock Creek, Kupreanoff Island, Alaska.



View of section of dam from downstream side showing some of the arch ring forms still in place.

summers of 1925 and 1926 up to the completion of the work. Concrete cannot be mixed and poured during the winter months in the high altitudes so that the actual building was confined to the summer seasons. The dam has a maximum height above the channel of the river of 147 ft. Rock and sand used in the mixing of the concrete were salvaged from the hard gray granite excavated from the Florence Lake tunnel and hauled out to the dump while the tunnel was being constructed.

Fifty-eight arches were required for the structure, supported by buttresses on 50-ft. centers. The thickness of the arch ring varies from 4.35 ft. at the foot to 1.5 ft. at the crest. The face of the dam has a slope of 42 deg. with the vertical.

In selecting the location to erect the dam the company took advantage of



General view of Florence Lake dam just completed by the Southern California Edison Company as a part of its hydroelectric project on the Big Creek and San Joaquin Rivers in the high Sierra in the northeastern part of Fresno County, Calif.

### New California Company Formed to Sell Washing Machines

Recently organized for the specific purpose of selling one line of washing machines, The Domestic Appliance Company, Inc., has opened executive headquarters at 1535 San Pablo Boulevard, Oakland, Calif. This company will concentrate its efforts in distributing the Model H machine of the Meadows Manufacturing Company, Bloomington, Ill., although it will handle the entire Meadows line in California.

A complete merchandising plan has been worked out in conjunction with a comprehensive advertising campaign. In forming its plans the company has recognized the fact that the average margin allowed the dealer is not sufficient to allow him to market the machine actively and also make a profit and has arranged to take a smaller margin itself in order to give the dealer a larger one.

Nine retail stores have been established by the Domestic Appliance Company in Alameda and Contra Costa Counties in California. In addition to establishing retail outlets with electrical, specialty, hardware and department stores, a similar number of retail stores will be organized in the vicinity of Los Angeles in the next sixty days.

Officials of the new company are: C. B. Angenete, president and general manager; R. D. Brigham, vice-president, Anglo-California Trust Company, San Francisco, vice-president; Leon Sloss, assistant trust officer, Anglo-California Trust Company, secretary-treasurer.

### Two More Units Recommended for Don Pedro Power Plant

A recommendation that two additional power units be installed in the Don Pedro power plant of the Turlock and Modesto Irrigation Districts has been made by R. V. Meikle and W. H. Holmes, chief engineers of the respective districts, and R. W. Shoemaker and R. J. O'Connell, electrical engineers for the same districts. The cost is placed around \$750,000. The report, which the engineers were authorized to prepare at a joint meeting of the directors on June 18, 1926, was placed before the Turlock directors at a late hour Aug. 9.

The addition of these two units will double the capacity of the Don Pedro power plant and will enable all of the water now used for irrigation to be used also for generating power. Under the present condition it is necessary during the irrigation period to open the irrigation outlets in the dam to deliver water, in addition to that passing through the wheels. The sale of the additional power thus developed will be delivered to the San Joaquin Light & Power Corporation.

As the Don Pedro power plant has been operating for the past three years at a yearly load factor of approximately 80 per cent, the additional capacity will enable the necessary repairs to be made with less interference with plant operation.

At the time the Don Pedro power plant was built in 1922-1923 openings were provided in the dam for two additional units and provision also was made in the tail-race tunnel for their installation.



# Engineering Societies Employment Service in San Francisco

As a result of the successful operation of the San Francisco office of the Engineering Societies Employment Service for the past eight months, the work will be continued as a time-saving aid to employers looking for men to fill positions requiring technical training and experience and also as an aid to men seeking employment along engineering and chemical lines. The extent of the service is shown by the fact that more than 200 positions, ranging from draftsman to resident engineer on hydroelectric construction, have been filled by men who have gone to nearly every Western state as well as Mexico and Alaska.

Men are registered from all over the world, and a weekly bulletin of positions open serves to inform the members regarding employment requirements which cannot be filled from the classified files in the office. There is no charge to the employer for this service and correspondence is invited from anyone having a vacancy in his organization.

No discrimination is shown against non-members of any of the supporting societies, though non-members securing employment through the bureau are required to pay 10 per cent of their first month's salaries to a licensed agency specified by the bureau, as the bureau itself is not licensed.

# Good Progress Is Being Made on Chelan Development

With June, 1927, now as the objective for completion of the first unit of the Chelan development of the Chelan Electric Company, the contractors now have more than 600 men at work on the project being built for the subsidiary of The Washington Water Power Company. The first unit will have a capacity of 32,000 hp.

The first of the two tunnels which will be required for the final installation of 128,000 hp. lies south of the Chelan River. Entering the tunnel from two adits and two shafts, workmen already have dug more than 3,500 ft. of the 12,000-ft. tunnel. Much of this is in a granite formation and requires no timbering. When completed the tunnel will be lined with concrete leaving a 14-ft. diameter. Most of the head of 380 ft. is between the surge tank and the power station. Excava-

tion work is now well under way on those two portions of the project where dragline with a 100-ft. boom is used with a 4-yd. bucket. Three shifts a day are being used by the contractors in the tunnel.

Excavation work is expected to begin in September on the dam, to be located on the Chelan River near where it flows out of Lake Chelan. The crews will be busy all winter on the project, and camp buildings have been constructed of materials and equipment suitable for cold weather.

# Work Under Way on B. C. Electric Company's Alouette Plant

Work has been started on the construction of the Alouette power plant of the British Columbia Electric Railway, the contract having been let to the Northern Construction Company and J. W. Stewart, Ltd. The contract covers the excavation for the power house and yards, construction of the complete power-house building, and driving of the penstock tunnel. The excavation extends 40 ft. below the high-water level of Stave Lake, which necessitates carrying on the work below water level behind a cofferdam. This cofferdam is already in place, having been constructed during the low-water period last spring by the company's construction department.

As soon as the building is completed to the crane rail the power-house crane will be installed and the erection of the turbine and generator started. This plant, which will add 12,500 hp. to the generating capacity of the company's system, is expected to be ready for operation by the fall of 1927.

# Electric Mill on Comstock Lode 1,700 ft. Underground

An electrically operated 200-ton mill soon will be functioning 1,700 ft. below the surface of the Consolidated Virginia mine in Virginia City, Nev., on the famous Comstock Lode. Space now is being hollowed out of solid rock for the mill site.

After the ore, obtained by top-slicing the old bonanza workings, is dropped down to the mill and crushed, the tailings will be sluiced out through the 4-mile Sutro tunnel, which connects with the mine near the mill site, and only the concentrates will be sent up the shaft. The result will be an immense saving in the handling of the ore.

# Voltage-Raising Plans to Effect 110-kv. Interconnection

Raising the voltage of a 60-kv. transmission line from Coulee to Chelan, Wash., to 110 kv. on Aug. 8, and rapidly completing arrangements for raising voltages extensively on other transmission lines, The Washington Water Power Company is engaged in an important program of line improvements for early fall.

Increased irrigation loads in the Okanogan and Chelan districts made necessary the extension of 110 kv. to Chelan where a new power station now is being built.

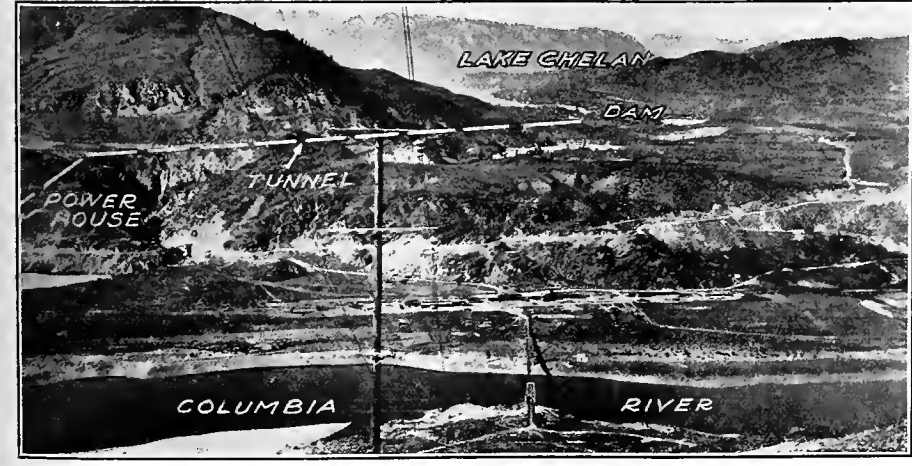
Line crews have been busy all summer building a new transmission line from Latah Junction to the Coeur d'Alene mining district, a distance of 67 miles. All but four miles of this line now is being operated at 60 kv. and the entire line will be ready soon. The line will be raised to 110 kv. soon, after a new substation is constructed at Latah Junction. At that time the new line from the Long Lake power station to Spokane and south to Latah Junction will be raised to 110 kv. This will give that voltage from the Long Lake station, through Spokane to Mullan Junction in the Idaho panhandle, a distance of 126 miles. A tie-line from there connects with the Montana Power Company's substation a few miles further on. The Montana company has restrung two 110-kv. lines from its Thompson Falls plant to the interconnection with The Washington Water Power Company system, putting in new copper, to be ready in September.

This arrangement will make possible interconnection at 110 kv. between the Montana Power Company's system and The Washington Water Power Company, including its line from Long Lake to Taunton, and the Chicago, Milwaukee & St. Paul Railway's transmission line to Puget Sound.

The Washington Water Power Company is making extensive installation of new substation equipment for the higher voltage in the Coeur d'Alene mining district at this time.

**Battery Company Adopts Group Insurance Plan.**—An extensive program of group insurance affecting about 4,500 employees in more than twenty cities throughout the United States and Canada has been adopted by the Electric Storage Battery Company, Philadelphia. Included in the plan are life insurance, health and non-occupational accident coverage and accidental death and dismemberment protection. The life insurance alone will reach a total of approximately \$5,000,000, while the accidental death and dismemberment insurance will amount to more than \$1,200,000.

**New Power Plant at Grand Lake, Colo., Improves Lighting System.**—Grand Lake, Colo., where annually the Lipton Cup yacht races are held approximately one and a half miles above sea level, now has a greatly improved lighting system following completion of a \$25,000 hydroelectric plant. The plant, erected by the Grand Lake Lodge, replaces a small unit which has outgrown its usefulness. It is located on a mountain side about a mile from the hotel where there is a fall of 200 ft. of water used for generating purposes.



The site of the Chelan power project being developed by the Chelan Electric Company, a subsidiary of The Washington Water Power Company, Spokane, showing locations of power house, tunnel and dam.

## Work Started on New Substation for Edison Company

Work was begun July 27 on the construction of a new outdoor substation for the Southern California Edison Company, at the corner of Bonnie Beach Place and Whiteside Avenue, Long Beach, Calif., according to Myron McNeal, local district manager. This new station is the standard outdoor type of substation used by the company as the initial unit on new substation sites.

When the load for the community has built up to such an extent as to require more substation capacity, this equipment will be dismantled and moved to another location, and a larger type of station built in its place. The territory to be served by this station is a rapidly growing section according to officials of the company, and the new substation with a capacity of 20,000 hp. is to be situated in the center of this district. The estimated cost of this installation is \$18,085.

## Portland Company Brings in New 20,000-kw. Steam Unit

Starting up the new 20,000-kw. Curtis steam turbo-generator at Station "L" early in August, the Portland Electric Power Company, Portland, has brought its total generating capacity up to 181,272 hp., and now operates the largest hog-fuel steam plant in the Northwest. The unit (*Journal of Electricity*, Feb. 15, 1926, p. 159) is a General Electric Company type ATB-4, 23,000-kva., 1,800-r.p.m., 11,000-volt machine, and is designed to operate at a throttle pressure of 175 lb. per sq.in. with a temperature of 550 deg. F. At present it will operate at low pressure on surplus steam from the present boilers, but plans for expansion of Station "L" next year contemplate the installation of increased boiler capacity and a change in throttle pressure to 385 lb. This change will increase the efficiency of the unit, reducing the steam consumption from 11.85 lb. per kw-hr. to 9.8 lb. per kw-hr. at the most efficient point of operation.

The unit was started by O. B. Coldwell, vice-president and general manager of the company, in the presence of a few company officials, city officials and business men of Portland. Interesting to the laymen present was the fact that the unit occupied a space 42 ft. long, 22 ft. wide and 13 ft. high and yet was smaller than a nearby old Corliss engine possessing one-tenth the capacity and using two and one-half times more steam per kw-hr. generated.

## News Briefs

**Contract Let for Power House at School.**—The State Board of Control at Olympia, Wash., has awarded a contract to Steiro & Hansen of Tacoma, Wash., for erection of a power house at the State Training School for Girls at Grand Mound, Wash., on a bid of \$11,716.

**B. C. Electric Company Opens New Substation.**—The British Columbia Electric Railway Company, Vancouver, has put its new substation, at Fifth Avenue and Fir Street, Vancouver, into operation. It is equipped with a 1,000-kw. motor-generator. This substation will be made automatic in the near future.

**Company Reports Increase in Customer-Owners.**—An increase from 377 owners of preferred stock in March, 1925, to 1,009 owners in March, 1926, is reported by the Coast Valleys Gas & Electric Company. In the same period the number of shares of preferred stock outstanding increased from 7,530 to 14,730.

**Work Started on Second Unit for Valmont Plant.**—Installation of a 25,000-kw. unit in its Valmont steam plant was started by the Public Service Company of Colorado late in July. The completion of this second unit will increase the rating of the plant to 45,000 kw.

**Power Line Franchise Granted in Snohomish County, Wash.**—The firm of Donaldson Brothers, Everett, Wash., has been granted a franchise by the county commissioners of Snohomish County to erect and construct power lines in Darrington and vicinity for the purpose of furnishing electricity for power and telephones.

**Manteca-Salinas Transmission Line Completed.**—The 104-kv. wood-pole transmission line from Salinas, Calif., to Manteca, Calif., built by the Pacific Gas and Electric Company, has been completed and is now in operation. A new transformer has been installed at the Salinas substation to step down the voltage from 104 to 60 kv. for distribution in the Salinas territory.

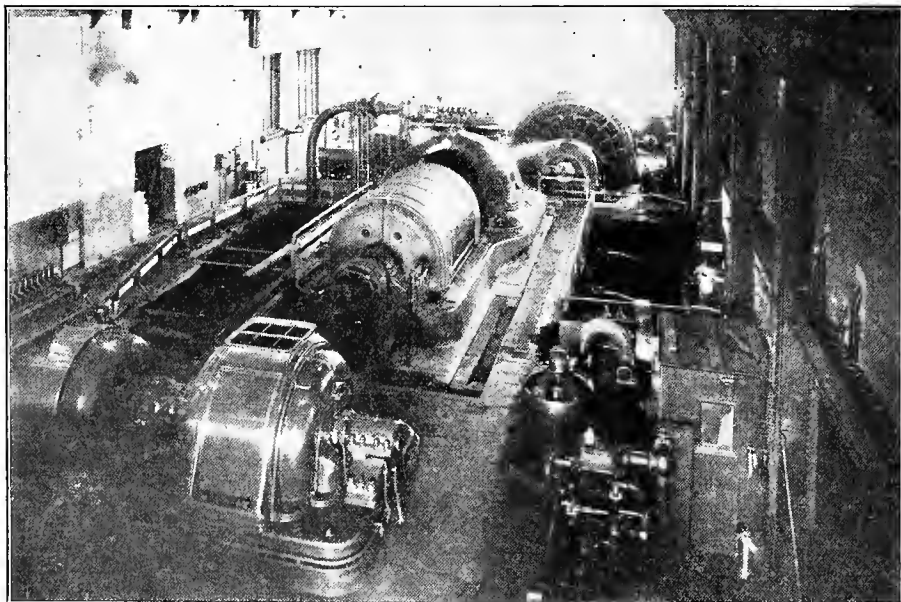
**Additional Equipment Being Installed in Edison Substation.**—Work has begun on the installation of additional electrical equipment in the Lancaster substation of the Southern California Edison Company. A new 60-kv. switching rack, together with necessary oil switches, meters and relays will be installed. The approximate cost of this new installation has been set at \$42,153.

**Portland Man Files on Deschutes River, Ore.**—Among recent applications for water filed in the office of the state engineer, Salem, Ore., is one for appropriation of water from the Deschutes River for power development to cost \$3,000,000. The meager information given out does not disclose the amount of water desired, the place at which it is to be appropriated, nor the size of the proposed development.

**Vernon, B. C., Gives Guarantee Not to Contract for Electric Supply for Three Months.**—The city of Vernon, B. C., has given the Royal Securities Corporation of Montreal a guarantee that it will not enter into a contract for the supply of electric energy, nor dispose of its water rights at Shuswap Falls for a period of three months, while the corporation's engineers are investigating the possibilities of developing and marketing power.

**Recommendations on the Denver-Cheyenne Air-Mail Markers Forwarded to Washington.**—Recommendations covering the installation of markers for the contract air mail route between Denver, Colo., and Cheyenne, Wyo., and for efficient illumination at the Denver terminus have been forwarded to the Department of Commerce at Washington by W. Irving Glover, second assistant postmaster general of the United States. Mr. Glover, who is of the opinion that adequate illumination is essential to efficient air-mail service, recently spent some time investigating conditions along the Pueblo to Cheyenne route.

**Colorado Utility Starts Construction on New \$300,000 Power Unit.**—The Trinidad (Colo.) Electric Transmission, Railway & Gas Company has started construction on a \$300,000-power-unit addition to its plant at Walsenburg, Colo. A new power line between Big Four and Rouse is likewise part of an expansion program necessitated because of demands made upon the plant by neighboring mines during the busy season last winter, according to H. T. Dabney, manager of the company at Walsenburg. It is believed that the new machinery, a 6,000-kw. turbine constructed by the General Electric Company, will be put into operation early next fall.



New 20,000-kw. turbo-generator unit installed at the Portland Electric Power Company's Station "L." Through the installation of this unit the company now operates the largest hog-fuel steam plant in the Northwest.

# Northwest Electric Light & Power Association

## Executive Committee Discusses Many Important Subjects

A wide number of subjects was discussed at the meeting of the executive committee of the Northwest Electric Light and Power Association held in Portland Aug. 9. Among the more important was that of the work of the Public Relations Section. D. C. Green, executive committee chairman, suggested that group meetings of company employees be held for the purpose of educating them with reference to the company's business so that in their daily contact with their neighbors and the public they would have sufficient information to be able to answer intelligently questions asked them regarding the company and its business. Mr. Green gave it as his opinion that this method would be much more effective than public-speaking campaigns.

The abolition of the industrial relations committee, the customer-ownership committee and the committee on co-operation with educational institutions was decided upon. The National Electric Light Association has a customer-ownership committee and it was felt that any information it might desire might be secured readily from the various companies. The vice-presidents of the various states should handle the work in regard to co-operation with educational institutions, in the opinion of those present.

In discussing the activities of the Commercial Section it was suggested that that section act as a clearing house for new ideas which could be passed along to member companies, thus using the section as a sales builder. The importance of gathering data on water-heater metering also was emphasized, as well as the gathering of information on the cost of servicing electric refrigerators.

That an investigation should be made by the Commercial Section into the practices of the various companies with reference to service furnished customers in connection with electric ranges and similar appliances was the consensus of opinion. It also was decided that the section should secure some information in regard to competitive power.

In discussing the activities of the Technical Section it was suggested that that section keep member companies fully advised of changes in the art.

Matters recommended for the attention of the Accounting Section included an investigation into the matter of handling payments on washing machines and other merchandise and that of shortening accounting procedure and eliminating unnecessary reports.

Lewis A. Lewis, sales manager, The Washington Water Power Company; Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, and A. C. McMicken, sales manager, Portland Electric Power Company, Portland, were appointed a committee on the amending of the con-

stitution. C. W. Lundquist, secretary of the association, was named chairman of the membership committee.

A motion that the next convention be held in Salt Lake City was carried. It was suggested that it be held either the week before or the week after the P.C.E.A. convention so that N.E.L.A. officers might attend.

## Lighting Schools Planned in This Year's Activities

Resulting from a conference between D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake City, president of the Northwest Electric Light and Power Association, and Clark Baker, of the National Lamp Works of the General Electric Company, Oakland, and chairman of the lighting committee of the Pacific Coast Electrical Association, tentative plans have been outlined whereby several lighting schools will be established in the territory of the Northwest Association during the forthcoming year.

Three schools are to be conducted, one each in Portland, Seattle and Spokane beginning some time in February, according to present plans. The schools are to be practically the same in every respect as the school to be conducted in San Francisco in September under the auspices of the San Francisco Bay Cities chapter of the Illuminating Engineering Society, under direction of Mr. Baker, president of that body.

According to the arrangements made between Mr. Green and Mr. Baker, the latter will attend the midwinter conference of the Commercial Section of the Northwest Electric Light and Power Association to be held some time in January. He will outline his plans for the lighting schools and efforts will be made to launch the schools immediately. Representatives from Boise, Idaho, and Salt Lake City will attend these schools and after completing the course will be given special training by Mr. Baker to fit them to organize and conduct similar schools in their own territory.

The association intends to purchase a complete set of the equipment needed for the schools so that more courses may be given if occasion should demand them. Under the concentrated plan worked out by Mr. Baker the school can be conducted in five sessions, usually arranged as two afternoons and three evenings in one week.

## Announces Subcommittee Chairmen of Engineering Section

Appointments of chairmen of the subcommittees of the Engineering Section, Northwest Electric Light and Power Association for the current year have been announced by F. J. Rankin, chief engineer, Idaho Power Company, Boise, the section chairman, as follows:

Accident prevention—J. B. Fiske, consulting engineer, The Washington Water Power Company, Spokane; elec-

trical apparatus—D. W. Proebstel, superintendent of tests, Portland Electric Power Company, Portland; hydraulic power—O. L. LeFever, superintendent, Northwestern Electric Company, Portland; inductive co-ordination—G. E. Quinan, chief electrical engineer, Puget Sound Power & Light Company, Seattle; meters—R. E. Thatcher, superintendent of service, Central District, Puget Sound Power & Light Company, Seattle; prime movers—C. C. Simeral, assistant chief steam engineer, Portland Electric Power Company, Portland; overhead systems—T. A. Purton, engineer, Idaho Power Company, Boise; underground systems—E. F. Pearson, electrical engineer, Northwestern Electric Company, Portland.

## P.C.E.A. News

### Advertising - Publicity Section Meeting Set for Sept. 10

A bulletin sent out to the members of the Advertising-Publicity Section, P.C.E.A., by Richard E. Smith, chairman, notifying them of a section meeting at 10 a.m. in the French Room of the Palace Hotel, San Francisco, outlines a new plan for midyear section meetings.

To quote from the bulletin itself: "The morning session is to be devoted to business and plans of the section. The afternoon session will be a junior convention, with a study topic, papers, discussions, and all the trimmings. Attendance at this afternoon session is not to be limited to members of the section, as everyone in the industry who is interested in the subject to be discussed, 'The Use of Direct-Mail Advertising to the Industry,' is invited, nay is urged to attend."

J. Charles Jordan, of the Pacific Gas and Electric Company, San Francisco, is to be the leader for the afternoon session. E. J. Blum, of Blum's Advertising Agency, and a recognized specialist in the field of direct-mail advertising, will present a paper, after which the meeting will be thrown open for general discussion.

### Insurance Committee Has Same Personnel as Last Year

The Insurance Committee, P.C.E.A., will be composed of the same members as served on that committee last year, there having been no change in the personnel.

The committee consists of Herbert Dewes, Southern Sierras Power Company, chairman; Clifton Peters, Southern California Edison Company, vice-chairman; V. D. Armstrong, Truckee River Power Company; R. J. Cantrell, Pacific Gas and Electric Company; W. E. Dufey, San Joaquin Light & Power Corporation; A. C. Johnson, Arizona Power Company; T. P. McCrea, Los Angeles Gas & Electric Corporation; H. R. Peckham, San Diego Consolidated Gas and Electric Company; and L. A. Reynolds, Great Western Power Company.



## News of the Electragists



### National President to Address California Electragists at Del Monte Meeting

Joseph A. Fowler, president of the Association of Electragists, International, has accepted the invitation of the California Electragists and will be one of the feature speakers at the convention to be held at Del Monte Oct. 1-2-3. Word received by the executive committee of the California Electragists from President Fowler indicates that he will attend the convention and will address the meeting on Saturday afternoon, Oct. 2. He has also been booked to speak before the San Francisco Electrical Development League on Monday following the Del Monte convention.

News that President Fowler would attend the convention gave added importance to the forthcoming convention of California Electragists. It is planned by both the Northern and the Southern Divisions that the occasion shall be made a worthy testimony of the close co-operation between the California Electragists and the central association by getting out a record turnout for the convention.

Registration and hotel arrangements under the chairmanship of H. C. Reid are progressing in good shape, with requests for reservations coming in every day. Indications from this source point to a good attendance.



Denver's fourth electrical home is the first Red Seal home in that territory.

Publicity and transportation under C. J. Geisbush and E. E. Browne, are being cared for effectively. Vic Lemoge as chairman of the entertainment committee needs no comment. He can be expected to provide all that there is in the cards for the occasion. For golf, Art Dahl has been placed in charge and he too promises everything to a queen's taste.

In charge of ladies' reception will be Mrs. H. H. Walker and Mrs. C. F. Butte, and it is their plan to see that the wives attending the convention shall be given every opportunity for an enjoyable and interesting time.

### Denver's Fourth Electric Home Is City's First Red Seal

Marking what he characterized as the beginning of a "new era in house construction and home comfort and convenience," Mayor B. F. Stapleton of Denver recently awarded a Red Seal certificate to Walter H. Simon, Denver architect, emblematic of electrical wiring adequacy and safety. The award was made during the weekly meeting of the advisory board of the Electrical League of Colorado, with A. C. Cornell, chairman, presiding. Fire Chief John F. Healy, Raymond Reeves, first vice-president, Denver Real Estate Exchange; Donald Weese, director, Architects' Small House Service Bureau, and others were present to witness the award.

Mr. Simon is the first home owner in Denver to receive the Red Seal certificate in recognition of adherence to wiring standards set by the Society for Electrical Development, New York.

Featured as the first Red Seal electric home to be publicly displayed in the territory, Denver's fourth electrical home was visited by 5,317 adults during an exhibition which lasted eight days.

The demonstration was a part of the program of the Electrical League of Colorado and provided an excellent op-

portunity for the public to grasp the significance of the Red Seal plan of electrical installation for residences. Twenty-five hundred Red Seal plan consumer booklets, obtained from the Society for Electrical Development, were discriminately passed out to visitors and particular reference was made to the fact that the home had been wired in strict conformance with Red Seal specifications.

The electrical home was a modest bungalow with 6 rooms and full basement containing a den, maid's room, bath, laundry and furnace room. The entire cost of the wiring and fixtures was stood by the builder but the fixtures were selected by him according to the suggestion of the league. Throughout the home no bare lamps were visible, even the frosted or tinted lamps being equipped with suitable glass shades or parchment shields.



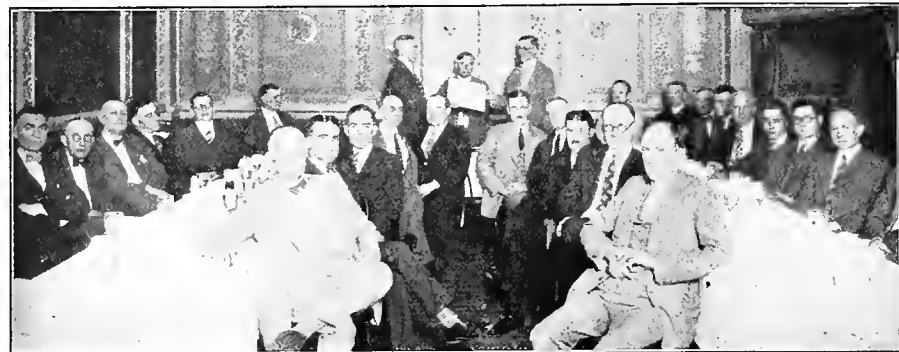
J. J. Hutchins of the Valley Electric Company, San Luis Obispo.

In all, 41 electrical appliances were used in the display and these were drawn by lot from the supplies of jobber members of the league. The furniture was loaned for the occasion by one of the local stores specializing in house furnishings.

The wiring installation, exclusive of the garage, consisted of the following 80 outlets: 14 bracket; 17 ceiling; 23 switch (including 6 sets of 3-ways); 22 duplex convenience and 4 special outlets consisting of 1 phone, 1 radio, 1 refrigerator, and 1 oil burner outlet.

C. F. McDonald, electrical contractor for the home, stated that merely his suggestion of the Red Seal plan to Mr. Simon was enough to secure the owner's immediate approval. Incidentally Mr. McDonald has chalked up more Red Seal jobs than any other individual member of the league.

C. T. Smallcomb, Electragist of Los Angeles, on account of increased business has found it necessary to move into larger quarters. He has now moved from 655 Wall Street to new and enlarged quarters at 507 East Seventh Street. This is the fourth move for this company in six years, each move caused by expanding business. "Our ideas for conducting an electrical contracting business were primarily obtained from the Association of Electragists, International, code of business ethics," writes R. E. Condit, of the company, in telling of the move. "We have been members of this association approximately six years and were one of its first members in Los Angeles."



Formal award of the first Red Seal certificate in Denver. Mayor Stapleton (left) presenting the certificate to Walter H. Simon, architect, owner of the first Red Seal home. A. C. Cornell, chairman of the league, is standing, center.



## Meetings

### Radio Trade Meeting at League Ushers in Exposition

Introducing the Pacific Radio Exposition to the electrical industry, representatives of the Pacific Radio Trade Association presented the program at the Aug. 23 meeting of the San Francisco Electrical Development League. A crowd filling the ballroom of the Palace Hotel attended the meeting.

A review of what radio has accomplished in the fields of communication and mechanics was given in a comprehensive talk presented by Ellery Stone, president of the Federal Telegraph Company, under the title of "What Radio Means Today." In his talk Mr. Stone spoke of the contributions made by radio engineering to electrical arts. He also summarized the progress of radio in communication and broadcasting of entertainment and information, and predicted a limitation of broadcast stations to one central station in each large center, from which by relay of programs from other similar studios the best talent would be available. The importance of radio to the power companies he showed by citing the increased use of electricity in longer evening hours, battery charging, and more recently the operation of sets directly from lighting circuits.

Arthur Halloran, editor of Radio, and president of the Pacific Radio Trade Association, was chairman of the day.

**Co-operation Subject of Talk at Santa Clara League Meeting.**—At a recent meeting of the Santa Clara Electrical Development League held in San Jose, Calif., Clyde Chamblin, president, California Electrical Construction Company, and prominent in Electragist affairs, was the principal speaker. Mr. Chamblin discussed the question of how the league could co-operate with other branches of the industry.

**B. C. Electric Office Staffs and Families Hold Picnics.**—The office staff and families of the British Columbia Electric Railway Company, Ltd.; Vancouver, to the number of nearly 600, recently held their annual picnic at Seaside Park where sports and dancing were enjoyed by all. George Kidd, president, and W. G. Murrin, vice-president, were in attendance, and Mrs. Kidd gave the prizes to the successful competitors. The Victoria staff held a similar affair at Elk Lake shortly before the Vancouver picnic.

**Utility Employees Hold Picnic.**—Employees of the Drum and Sacramento Divisions of the Pacific Gas and Electric Company and their guests enjoyed a highly successful picnic in Grass Valley, Calif., Aug. 21. There were all kinds of races and contests, dinner and "all the fixin's," dancing and other entertainment. One of the main events was a baseball game between the teams from the two divisions. The game was won by the Sacramento Division team. There was an attendance of about 400 at the gathering.

**Inaugural Ceremonies of Officers of Los Angeles G. and E. Employees' Association.**—The newly elected officers and directors of the Los Angeles Gas and Electric Employees' Association recently were installed with appropriate ceremonies. Following a reception, with the officers and directors and their wives in the receiving line, short talks were delivered by D. F. McGarry, a vice-president of the Los Angeles Chamber of Commerce, Wm. A. Baurhyte, president of the company, and H. B. Wells, president-elect of the association. A concert and dancing concluded the evening. Frank Weiss, temporary chairman of the association, had charge of the affair.

**Jobbers and Manufacturers' Representatives Hear Details of Red Seal Plan.**—For the purpose of thoroughly acquainting the jobbers and manufacturers' representatives in his territory with the details of the Red Seal plan, G. H. P. Dellman of the San Diego Consolidated Gas & Electric Company recently called a meeting of the members of that branch of the industry. Twenty-five attended the gathering, which was addressed by W. F. Brainard of the California Electrical Bureau.

## COMING EVENTS

### Engineering Section, P.C.E.A.—

First Group Meetings Los Angeles, Calif.  
Los Angeles Gas & Electric Corporation Bldg.  
Sept. 1-3, 1926.

### Electrical Supply Jobbers Association, Pacific Division—

Annual Convention  
Empress Hotel, Victoria, B. C.  
Sept. 7-9, 1926

### American Institute Electrical Engineers—

Pacific Coast Convention, Salt Lake City, Utah  
Sept. 7-10, 1926

### Advertising-Publicity Section, P.C.E.A.—

Palace Hotel (French Room)—  
San Francisco,  
Sept. 10, 1926

### Rocky Mountain Division, N.E.L.A.—

and  
Colorado Public Service Association—  
Joint Convention, Glenwood Springs, Colo.,  
Sept. 13-16, 1926

### California Electragists—

Annual State-wide Meeting—Hotel Del Monte  
Del Monte, Calif.  
Oct. 1-3, 1926

### Northwest Association of Electrical Inspectors—

Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 18-19, 1927

**Reservations for Jobbers' Convention Should be Made Promptly.**—A second notice has been sent out by Albert H. Elliot, secretary, Pacific Division, Electrical Supply Jobbers Association, requesting that reservations for that division's convention be made promptly. The convention is to be held at the Empress Hotel, Victoria, B. C., Sept. 7-9, and as the northern committee must make full arrangements, Mr. Elliott stresses the fact that all data relative to reservations must be in his hands without delay.

## Book Reviews

### ALTERNATING CURRENTS

By Carl Edward Magnusson, professor of electrical engineering, University of Washington, Seattle. Third edition, 1926. 611 pages, 522 illustrations, 6 x 9 in., cloth bound. McGraw-Hill Book Company, Inc., New York. \$5.

This textbook represents a 10-year development of lectures and classroom discussions given by the author. Since the preparation of the original edition two revisions have been made, the last dated March, 1926, bringing the material fully up to date. It is designed as a general textbook for undergraduates and as such has had about twenty years successful use. The material dealt with is limited largely to fundamentals, with a few illustrations of their application to practical problems.

Pains have been taken by the author to explain the relations between the factors involved and to express the physical facts in mathematical forms in such a manner that the student may understand the equations and their rational application. Graphical diagrams are used extensively and a few typical problems are given.

Topics are arranged in a sequence that is advantageous to the student. Elemental principles are developed and then applied successively to the simpler and the more intricate machinery and equipment. Discussions of transmission lines occupy about ten per cent of the content of the book. The concluding chapter constitutes a rather complete introduction to the study of the long-distance transmission line.

### PRACTICAL RADIO

By James A. Moyer, S.B., A.M. Director of University Extension, Massachusetts Department of Education; and John F. Wostrel, Instructor in Radio and in charge of Industrial Subjects, Division of University Extension, Massachusetts Department of Education. Second edition, 1926. 271 pages, 182 illustrations, 5 1/4 x 7 1/2 in., cloth bound. McGraw-Hill Book Company, Inc., New York. \$1.75.

This book constitutes a useful contribution to the quantity of works published upon radio and allied subjects. The first few chapters are given over largely to a discussion of some of the more important fundamentals involved in the consideration of radio equipment and its application. Mathematics has been avoided by the authors in order to make the book more widely useful.

Descriptions of various types of sets are given beginning with the most simple crystal sets and progressing through the more complicated vacuum-tube sets. A chapter is devoted to a discussion of radio-frequency amplification and another to audio-frequency amplification, both being subjects not too clearly understood by the average practical radio man. Chapters also are devoted to the subjects of construction of radio sets and of common troubles and their location.

The book is up-to-date and, while naturally containing no particular revelations, should be a handy and valuable reference book for the practical radio fan, or for purposes of instruction within its limits.

## Personals

Herbert S. Sands, manager of the industrial division, Westinghouse Electric & Manufacturing Company, Denver, has been signally honored in that he has received from the University of Colorado the degree of electrical engineer although he is not a university man. The subject of Mr. Sands' thesis was "The Electrical Engineer in Industry." Never before in its history



HERBERT S. SANDS

has the University of Colorado conferred a master's degree upon any engineer who had not previously attended some institution of higher education. Mr. Sands is an outstanding figure in Colorado engineering and other scientific fields. He always has taken a leading part in the educational and public relations activities of the public utilities of the state. He was born in Stamford, Conn., in 1874, and received a common school education, after which he completed a student course of the Edison General Electric Company. After a few years of practical experience and study his qualifications as an engineer were recognized, and in 1893 he was appointed superintendent of the Baltic Power Company, operating in the Cripple Creek mining district, Colorado. Later he became associated in a supervisory and consulting capacity with some of the largest mining companies in the Cripple Creek and Idaho Springs regions. In 1901 he was summoned by the Westinghouse company to take charge of its industrial division. At the present time Mr. Sands is president of the Colorado State Board of Engineers' Examiners and of the Colorado Engineers' Council. Since 1905 he has been district vice-president of the American Institute of Electrical Engineers. He was president of the Colorado Scientific Society in 1923 and 1924. He is a member of the Denver Chamber of Commerce and various other Denver civic organizations. As chairman of the educational department of the Rocky Mountain Committee on Public Utility Information, which embraces the three states of Colorado, New Mexico and Wyoming, Mr. Sands has been responsible for the introduction of public-utility courses, lectures and studies in virtually every

university and college. Recently the University of Colorado inaugurated a correspondence course covering the economics of the utility industry, based upon plans worked out in conjunction with Mr. Sands' committee. The high schools of Denver this fall will take up a course of study provided by Mr. Sands' organization.

C. G. Stoll, general manager of manufacture, Western Electric Company, New York, has been elected a vice-president to succeed the late H. F. Albright. Mr. Stoll formerly was manager of the company's Hawthorne Works in Chicago.

Edward Dean Adams of New York recently was presented formally with the John Fritz Medal awarded for the year 1926 by Engineering Foundation to him "for great achievements as engineer, financier, scientist, whose vision, courage and industry made possible the birth at Niagara Falls of hydroelectric power." The medal, established in 1902 in honor of John Fritz of Pittsburgh, is awarded annually for notable scientific or industrial achievement.

R. D. Hightshoe, formerly associated with the Mine & Smelter Supply Company, Denver, is now a member of the city sales staff of the Graybar Electric Company.

B. C. Watts, of B. C. Watts & Company, Denver, has been making a visit in California where he expects to spend a month or six weeks.

R. W. Lawlor, formerly cashier for the Bend Water, Light & Power Company, Bend, Ore., has been transferred to the treasury department of the Pacific Power & Light Company, Portland, in charge of keeping the general books of the newly organized Deschutes Power Company, another Electric Bond & Share Company holding.

E. C. Headrick, of Denver, executive committeeman, Mountain States Division, A.E.I. has left for Cedar Point, Ohio, to attend the annual convention of the association in that city. Mr. Headrick is past chairman of the Electrical League of Colorado and as an advisory board member has been delegated to represent that organization at the National League Council and Camp Co-operation VI to be held at Association Island following the Electragists' convention.

Raymond L. Brown, engineer for The New Departure Manufacturing Company, Bristol, Conn., recently spent a short time in San Francisco en route to the Northwest.

Homer W. Eddy, sales manager of the Riegos y Fuersa del Ebro S. A. C. Barcelonesa de Electricidad, Barcelona, Spain, visited Spokane for a few days in July. Mr. Eddy was formerly an employee of The Washington Water Power Company.

R. P. Bayne, formerly cedar pole service manager for the Weyerhaeuser Sales Company, Spokane, has been made manager cedar pole sales for that company, succeeding F. H. Burke, who has been appointed manager of its Chicago district.

Frank J. McEniry, who has been head of the publicity department of KOA, the General Electric Company's radio station in Denver, has resigned to enter the newspaper field on the Pacific Coast. Miss Margaret L. Bonar, widely known in Denver newspaper and advertising circles, will succeed Mr. McEniry.

Preston B. Postlethwaite, since 1923 vice-president of the Wagner Electric Corporation, St. Louis, has been elected president, succeeding Waldo A. Layman, resigned. Mr. Postlethwaite has been connected with the corporation for seventeen years, having entered its employ as an apprentice at 15 cents an hour.

F. L. Rohrbach, superintendent of underground department, Washington Water Power Company, Spokane, has been issued a patent on a device for protecting underground lead cable from injurious wear at the duct end. Mr. Rohrbach recently was appointed member at large on the underground systems committee, Engineering National Section, N.E.L.A.

Don Grey, for the past two years employed as a salesman for the Westinghouse Electric & Manufacturing Company in its Klamath Falls, Ore., territory, has been transferred to the industrial division of the San Francisco office. He succeeds Gano R. Baker, who recently resigned to become sales engineer for the Spencer Elevator Company in that city. Prior to his transfer to the Pacific Coast Mr. Grey was connected with the company's sales department in East Pittsburgh for several years.

D. L. Huntington, president, The Washington Water Power Company, Spokane, recently made a trip East. He was expected to return about Sept. 1.

Dr. W. D. Coolidge, assistant director of the research laboratory of the General Electric Company and inventor of an X-Ray tube which bears his name and is used universally in hospitals and laboratories, has been awarded the Howard N. Potts gold medal for 1926 by the Franklin Institute of Philadelphia. The medal was awarded "in consideration of the originality and ingenuity shown in the development of a vacuum tube that has simplified and revolutionized the production of X-Rays."

Dr. George Otis Smith, director of the United States Geological Survey, was in Salt Lake City for several days during the early part of August. While in that section he attended the Uintah Basin industrial convention held at Fort Duchesne, Utah, where he delivered an address, as the personal representative of Hubert Work, Secretary of the Interior, on the subject "The Interest of the Interior Department in Utah." Dr. Smith has been making a tour of the West, conferring with survey officials of the various states.

Edward H. Sniffin, assistant to vice-president of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, was a visitor in San Francisco for several days during August. He is one of the three men who were directly responsible for the general use of the steam turbine in the United States. The other two were George Westinghouse and Francis Hodgkinson, engineer and turbine designer.

Dr. Harris J. Ryan, head of the department of electrical engineering at Stanford University, is to be presented with the Edison Medal at the A.I.E.E. convention to be held in Salt Lake City in September. Dr. Ryan was awarded the medal for the year 1925.

Harry S. Schott, for the past two years assistant general sales manager for the National Carbon Company, Inc., New York City, has been appointed general sales manager.

C. E. Schnell, of the San Joaquin Light & Power Corporation, Fresno, paid a visit to the Exchequer plant of the Merced Irrigation District recently.

Frank E. Cronan, Pacific Coast representative, George W. Dunham Corporation, Utica, N. Y., has left for a business trip in the Northwest territory, principally around Portland, Ore.

Prof. G. G. Ponti, noted engineer of Turin, Italy, recently inspected the Pacific Gas and Electric Company's load-dispatching station at Oakland and the Vaca-Dixon substation. Professor Ponti came to America to gather data to support his recommendation for a 200-kv. transmission line in Italy.

M. N. Farr, Western sales manager, Howell Electric Motors Company, Howell, Mich., was a recent Pacific Coast visitor. He spent some time in Vancouver, Seattle, Portland and San Francisco.

H. H. Rogge, who has been connected with the general engineering department of the New York sales office of the Westinghouse Electric & Manufacturing Company, has been appointed that company's special representative to the Philippine Islands. His territory also will include the Dutch East Indies, the Malay Peninsula and Siam.

Robert M. Davis, since 1919 statistical editor of the Electrical World, has been made statistical adviser of the McGraw-Hill publications. Prior to joining the staff of the Electrical World Mr. Davis was connected with the U. S. Geological Survey for several years.

Arthur T. Hadley, former president of Yale University, recently spent some time in San Francisco. While there he served as an important witness for the Pacific Gas and Electric Company in the hearing before the California Railroad Commission relative to the evaluation of that company's system in San Francisco.

Walter S. Jennens, associated with the Utah Power & Light Company, Salt Lake City, and its predecessors over a period of twenty-eight years, has resigned to accept a position as electrical engineer with the Ohio Brass Company, with headquarters at Barberton, Ohio. Mr. Jennens was in charge of high-tension construction work at the time of his resignation.

J. O. Presbrey, Pacific Coast sales manager, Ivanhoe Division of The Miller Company, Cleveland, has returned to Los Angeles from a two-months' trip to Panama and Havana. Mr. Presbrey also visited the company's factories at Meriden, Conn.

C. P. Kinkaid has been appointed distribution superintendent of the Valley Division, Central District, Puget Sound Power & Light Company, Seattle. He succeeds C. S. Noble who has resigned to accept a position with the Tampa Electric Company.

S. D. H. Pope, formerly connected with the electrical engineering department of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., has become assistant engineer for the municipality of South Vancouver.

F. E. Weymouth has severed his connection with Brock & Weymouth, Inc., as active head, although he remains a director and consultant of the company, and has been engaged by the J. G. White Engineering Corporation as chief engineer for work in Mexico.

Ladner V. Ross, formerly connected with Curtis Lighting, Inc., Chicago, has been appointed illuminating engineer for The Washington Water Power Company, Spokane.

A. B. Vandercook, who has been sales manager of the Graybar Electric Company, has been made assistant manager of the Los Angeles branch. H. T. Simmons, assistant sales manager under Mr. Vandercook, has been named as his successor.

R. M. Alvord, district manager for the General Electric Company in San Francisco, recently returned from a trip to the company's plant in Schenectady, N. Y.

P. H. Booth, Edison Electric Appliance Company, Los Angeles, stopped in San Francisco a short while ago en route to Alaska.

H. H. Jones, vice-president and general manager, Western States Gas & Electric Company, Stockton, Calif., recently paid a brief visit to San Francisco.

C. B. Angenete, president and general manager of the Domestic Appliance Company, Inc., Oakland, Calif., recently has returned from a trip to the factory of The Meadows Manufacturing Company, Bloomington, Ill.

W. L. Kirkman, formerly a load dispatcher at Pasco, Wash., for the Pacific Power & Light Company, has returned to his former position after having spent two years studying electrical engineering at Purdue University, from which he has received his degree.

Dr. Robert A. Millikan, since 1921 executive head of the California Institute of Technology, Pasadena, has had conferred upon him the A.S.M.E. medal. Dr. Millikan, whose most noteworthy work probably is that in connection with his research into the nature of the electron, also has been the recipient of the Edison medal of the A.I.E.E., the Hughes medal of the Royal Society of Great Britain, the Nobel prize of the Swedish Academy and the Faraday medal of the London Chemical Society.

E. E. Scofield, industrial engineer of The Washington Water Power Company, Spokane, recently attended the N.E.L.A. industrial electric heating course held in Mansfield, Ohio.

C. M. McIntosh, Denver representative of the MacBeth-Evans Glass Company, lately made a trip to El Paso.

R. H. Manahan, city electrician of Los Angeles, made a business trip to San Francisco a short time ago.

W. L. Barbee has been appointed distribution engineer of the central district of the Puget Sound Power & Light Company, Seattle, filling the vacancy caused by the resignation of D. R. Nankervis.

Frank N. Smith, formerly with the Pacific Gas and Electric Company, San Francisco, and previous to that southern district representative for the California Electrical Bureau, is now manager of the educational department for Pathe Exchange, Los Angeles. For years Mr. Smith has been a personal friend of Roald Amundsen, the Arctic explorer, and recently delivered before members of the San Francisco Electrical Development League a most interesting address on the Amundsen-Ellsworth polar flight.

W. R. Matthews, district salesman for The Miller Lamp Company, recently spent three days in Spokane.

Franklin S. Terry, one of the notable men in the electrical field, died suddenly July 22 at his country home, Black Mountain, N. C. He was a pioneer in the incandescent lamp industry and his activities had much to do with the promotion and progress of electric lighting. He was born in Ansonia, Conn., in 1862, was graduated from the Ansonia High School in 1880 and then began his active business career as a bookkeeper with The Electrical Supply Company of Ansonia. In 1889 he had organized the Sunbeam Incandescent Lamp Company of Chicago, and when he left the Electrical Supply Company in 1893 he took personal management of the lamp business which, under his direction, progressed steadily. He di-



FRANKLIN S. TERRY

rected his energies toward improvement of the product and made his company one of the leaders in the lamp business, conducting it until May, 1901, when the Sunbeam company was purchased by the National Electric Lamp Company. He engaged with the company, first as secretary and later as first vice-president. In 1911 the company was merged with the General Electric Company. Then Mr. Terry continued with the National Lamp Works of the General Electric Company, at Nela Park, Cleveland, of which he and B. G. Tremaine were the managers. At the time of his death he was vice-president of the General Electric Company and also a director of the Cities Service Company. He was one of the organizers of the National Electric Light Association when that body was founded in February, 1885, at Chicago. For many years he had served on the association's incandescent lamp committee.

Charles D. Jenney, a pioneer in the development of direct-current motors and systems of electrical control, died recently in Indianapolis. Mr. Jenney was one of the first manufacturers to employ carbon brushes on motors and also one of the first to build small 500-volt direct-current motors, a field in which he was pre-eminent at the time.

George H. Eveland, electrical engineer in charge of power-house layout design for the Feather River Power Company, San Francisco, died Aug. 19 of pneumonia.

R. B. Childs of the commercial department of The Washington Water Power Company, Spokane, spent two weeks in military training at Fort Wright in that city, after which he visited for several days in Seattle.

## TRADE NOTES

**Bakelite Corporation**, New York City, has issued a new folder illustrative of the uses of its product, which it is claimed supersedes amber, celluloid, fibre, gallalith, glass, horn, ivory, jet, metal, paper, porcelain, rawhide, hard rubber, shellac, vegetable ivory and wood. The commercial forms of Bakelite include Bakelite molder, Bakelite laminated, Bakelite transparent, Bakelite varnishes, lacquers, enamels and cements.

**Wyatt's Lighting Fixtures**, 1810 Westlake Avenue, Seattle, manufacturers of specially designed lighting fixtures, recently has been established by N. D. Wyatt. He was formerly connected with Bailey, Wyatt & Lynde.

**George Richards & Company**, Chicago, have placed on the market recently another type of steel-encased bell-ringing transformer designed for residences and small apartments. It is mounted on a round outlet box cover and can be furnished mounted on either a 3 3/4-in. or 4-in. cover. The company claims that this type of transformer is of a decided advantage in that the transformer is grounded and attached to the outlet box so that a drop-cord may be run from the same box.

**The Couzens Ice Machine Company** has removed its sales headquarters from Lima, Ohio, to Detroit, and increased scope of its operations and the rapid maturing of plans developed during the past nine months are anticipated developments following the removal, according to a statement by the company. Definite policies have been adopted in conference between Senator Couzens and other executives of the company, based on the experience gained through the operation of the Superior Division which took over Superior Refrigeration, Inc., several months ago.

**Electric Steam Heating Company**, 4711 Ballard Avenue, Seattle, has placed on the market the Perfection combination waffle plate and grill. It has an aluminum grid and an expansion hinge that allows the waffle to raise evenly both front and back while cooking. It also allows for removal of the top and placing in position for cooking on both top and bottom. The heating element is made from the very best material obtainable, it is claimed, and is used in a nest made by the company's own secret process, thus insuring an even distribution of all heat to the grid.

**Westinghouse Electric & Manufacturing Company**, East Pittsburgh, has issued Registers of Revenue, a publication dealing with the description of the advantages of the design of watt-hour meters. The permanent accuracy of the watt-hour meter, low costs of adjustments and tests, low costs of handling, ease in reading and saving of storage space are some of the points covered in this circular, C-1753. This publication may be obtained from any of the district offices of the Westinghouse company or from the publicity department at East Pittsburgh.

**Edison Electric Appliance Company, Inc.**, Chicago, has purchased a six-story fireproof building at 1910-28 S. 52d Avenue, in that city, to take care of its rapidly increasing business. This is due to the popularity of household electric appliances and hotel and restaurant cooking equipment, of which the company claims to be the largest manufacturer in the world.

**The Edwin F. Guth Company**, St. Louis, has issued a folder descriptive and illustrative of the Guthlite Super-Illuminator. It is made in an attractive design, controls and directs light and is suitable for any kind of ceiling, high or low, light or dark, beamed or plain, according to the manufacturer. Sizes and price lists are included in the folder.

**The Ludlum Steel Company**, Watervliet, N. Y., is planning to change over the remainder of its melting furnaces from manual to automatic electric control. This company uses electric furnaces of its own patented design, featuring a movable hearth with a consequent increase in production per furnace.

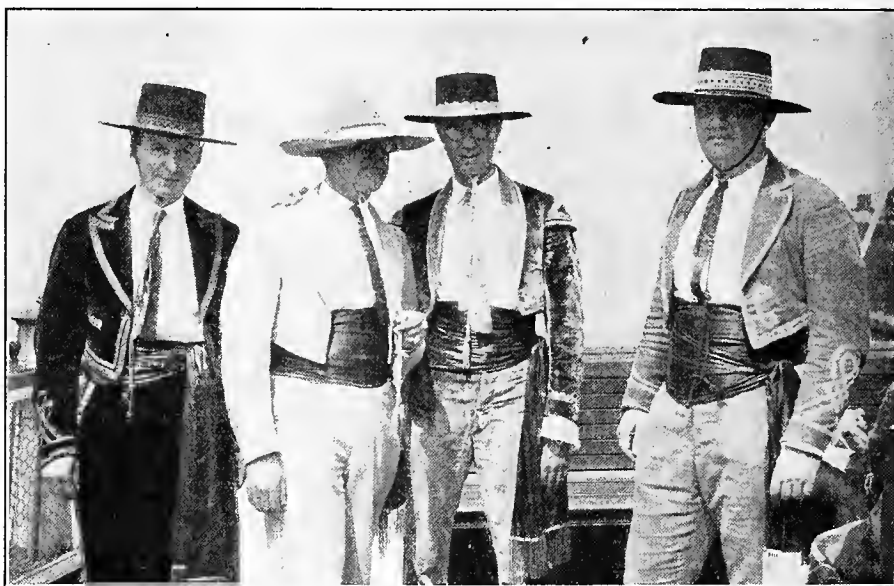
**The Leonard Refrigerator Company**, Grand Rapids, Mich., has announced its purpose to concentrate production on styles and sizes of refrigerators which have proved themselves best sellers in the market. The new Leonard Cleanable models, built extra strong and with extra-thick insulation, are offered by the makers as ideal for use with electrical refrigeration. They are equipped for convenient installation of the electrical unit.

**Harold E. Trent**, Philadelphia, has added a new melting pot to its line. This pot is suitable for melting babbitt, solder, lead and tin and has a capacity of 10 lb. It is adapted for 110 and 220 volts a.c. and can be connected to a lamp socket. It is fitted with spouts and two handles to facilitate pouring metal if so desired.

**Roller-Smith Company**, New York City, has issued bulletin No. 810 covering its radio frequency ammeters, milli-ammeters, and current squared meters. Type TW and type FW ammeters are recent devices put out by the company, and complete descriptions with price lists are given in the bulletin.

**Trumbull-Vanderpoel Electric Manufacturing Company**, manufacturer of "T-V" safety switches and knife switches, recently held a sales conference at its home office in Bantam, Conn., that was attended by representatives from all over the country. During the conference Ralph K. Mason, who has been president of the company for a number of years, announced his retirement from the firm, and in appreciation of his long and valuable services the sales force presented him with a watch and chain. **Harmon J. Cook** is the new president, **John H. Lancaster**, vice-president and general counsel, and **James N. Miller**, secretary and treasurer.

**A. E. Bacon**, manufacturers' agent, formerly associated with the Mine & Smelter Supply Company, Denver, recently returned from a trip East after having completed negotiations with several manufacturers enabling him to act as their district representative with headquarters in Denver. Among the accounts are included **Benjamin Electric Company**, **American Pipe Bending Machine Company**, **Autovent Fan and Blower Company**, **McGill Manufacturing Company**, **Autocall Company**, and **National Metal Molding Company**.



Four gentlemen from Spain off to a fandango to whisper sweet nothings in the cars of pretty señoritas? Not at all. Four gentlemen from Los Angeles off to Nela Park, Cleveland, to attend the Mazda sales conference. Then how come the scenery? Patience, my children. These caballeros are the winners of the Graybar Electric Company's "On to Nela" contest wherein each sales contract counted for so many miles, each advertising service sold counted for so many miles, and he who accumulated 10,000 miles was it. Each of our Spanish friends ran considerably over that total so they took the little jaunt. Being from Los Angeles, they just couldn't resist dressing in the costume of the days "before the Gringo came" just to show how different it is now. They even started their travels in "The Padre" and—subtle touch—they distributed oranges on the way just to emphasize the section whence they came. Left to right the señores are—Jim Loomer, Roy Lockhart, Leon Collins and P. Chambers.



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Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

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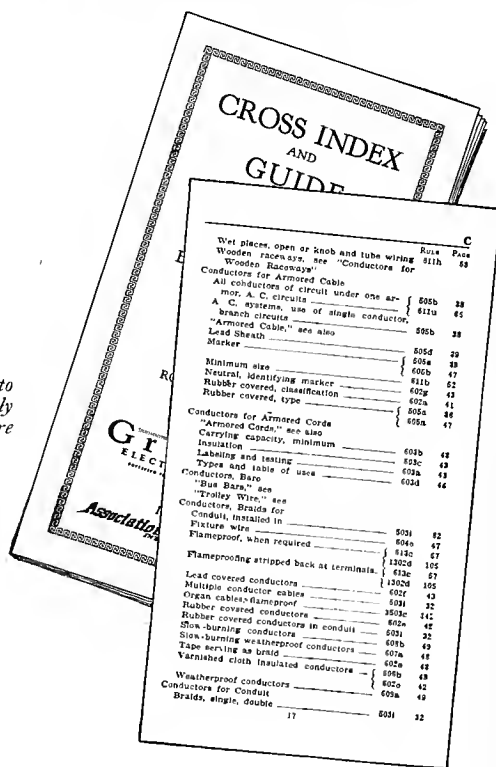
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## "Circuit Riders"

"CONVENTION Circuit Riders" is a term which might be aptly applied to the members of the editorial staffs of technical journals. They probably attend more conventions than any other man in the industry which their paper serves. Theirs is the job of bringing back a permanent record so that the important thought brought out in the convention sessions will not be left to memory alone.

During the fortnight just closed two important conventions have taken place in the Western states. The "Circuit Riders" have attended both. In the next issue of the Journal of Electricity will be a complete report of the Pacific Coast convention of the American Institute of Electrical Engineers held in Salt Lake City, Sept. 6-10. The outstanding contributions to the art presented in the many papers as well as the most interesting parts of the discussions will be digested.

At Glenwood Springs also the Rocky Mountain Division of the N.E.L.A. and the Colorado Public Service Association held their joint convention Sept. 13-16. Once again the "Circuit Riders" were on the job and the papers and discussion relating to the problems of the electrical industry in the Rocky Mountain states will be made the subject of a complete and comprehensive report.

Both of these reports will reflect the advancement of the industry and will present its ideals and aspirations. Both will be well worth reading.

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# EDITORIAL

## Baker Fishway Points the Way

POWER and fish interests alike rejoice at the success of the fishway at the 260-ft. Baker River dam of the Puget Sound Power & Light Company, as described in this issue. Here is the first instance in which the spawning cycle of migratory fish has been unimpeded by a high dam. In the spring of this year a few thousand mature sockeye salmon were passed over the dam to the spawning grounds above, and several times as many thousands of offspring of a similar, prior run proceeded down on their way to the sea, which is the natural, immutable law of the salmon in its life cycle.

It has been alleged, and generally is believed to be true, that salmon will not of their own accord ascend a fish ladder of an elevation greater than fifty feet. When the fishery interests of the Northwest saw that the power interests were contemplating high-dam developments on spawning rivers this fact caused some alarm, and a potent protest was set in motion. But the fish men found the power companies alive to the importance of the fish industry, cognizant of the spawning problem, and eager to work out a solution in co-operation with state officials and commercial fishermen. Hydroelectric engineers felt that a mechanical lift could be used successfully; fishermen and game commissioners harbored some doubts. It was agreed that the problem was only about one-half engineering, in that the other half was how to get the fish to enter the mechanical device. Engineers and ichthyologists put their heads together, some experiments were made, and finally W. D. Shannon, superintendent, Stone & Webster, Seattle, builder of the Baker dam, working with fish and game commissioners of the state, demonstrated in actual practice that the obstacle is not insurmountable.

The Baker fishway applies a number of new principles in fishway design and operation. In the first place it requires the fish to swim to an elevation of only about forty feet and then carries them in a tank of water the balance of the height of the dam and dumps them into the reservoir above. In the second place the fishway entrance is at the power house, or some thousand feet below the dam, and to keep the fish from nosing up to the base of the dam a rack is stretched across the river just above the power house. Further, the swift tail water from the wheels is used to attract the fish to the entrance to the fishway, which is adjacent to this tail water. Lastly, the ladder part of the fishway has steps of only two-feet elevation requiring a minimum, and therefore a less tiring jump, and in addition each step is equipped with a trap device

to keep the fish from drifting back down once it has entered the ladder. This latter feature of the design has led to some speculation as to whether or not the fish of their own accord might proceed the entire distance over the dam if given a sufficiently flat grade, but such a ladder would present additional engineering problems and probably would be as expensive as the present hoisting device.

The significant thing about the Baker River success is that the fish are diverted from their natural course upstream, are practically trapped, and are delivered without injury to the stream above the dam. In this lies the hope of ultimate solution of any similar problem in the future, which means that hydroelectric development on spawning rivers may continue without harming the great fish industry on the Pacific Coast. What has been accomplished on Baker River can be accomplished elsewhere. Each problem will be an individual one; but each can be worked out by taking into consideration the nature of the stream and the habits of the fish running in it, and then building suitable devices to meet the conditions and operating the whole to suit the characteristics of the run.

Some mention of the other and equally important half of the problem should be made—that of getting the young fish safely down below the dam again when they migrate to the sea. Some experts had held the opinion that a drop over the dam would not hurt these fry; others thought they might go through the runners of the water wheels and live to be caught or spawn again; still others opined that both were wrong. But no one knew, and it remained for the Baker experiment to disprove or verify at least one theory. What has been proved on the Baker River is that the young fish in schools actually do make the 260-ft. drop in a column of spill-water over the dam without injury. Thus has the spawning cycle been completed, and thus have been settled several important points of a controversy that two years ago seriously threatened hydroelectric development in the Northwest.

## Oregon to Vote on State-Owned Power System Run by "Housewives"

OREGON voters will find on the ballot in that state on Nov. 2 an amendment to the state constitution labeled "Water and Power Bonding Amendment." This measure was sponsored by the Housewives' Council, Inc., of Portland and only received a place on the ballot after a court fight to determine whether or not sufficient signatures had been secured to initiate it. The proposed amendment is patterned in most respects after the famous or infamous California \$500,000,000 Water and

Power Act which has been defeated twice and which will be voted on for a third time at the coming election. In some respects, however, the Oregon legislation is even more impracticable and visionary.

In the first place the Oregon amendment names the five members who will constitute the Water and Power Board for the first four years, the majority of whom will be in control. Not one of the individuals named has any experience to qualify him or her to administer an enterprise concerned with power, irrigation and domestic water projects. From the standpoint of one familiar with the intricacies of the electric light and power business this is amusing. From the standpoint of the taxpayers who will be forced to make up the deficits and pay for mistakes it is tragic. Under private management such a business could be successful only when managed by men of long experience who had demonstrated marked executive and organizational ability. The character of executives developed in the electrical industry amply demonstrates this point. To invest such a board with the unlimited power to engage in the business contemplated by the provisions of the amendment and to place in inexperienced hands the expenditure of the \$52,944,000 plus such other money as the board should need would be folly of a character beyond the wildest dream of a 1905 Socialist.

Some of the other objectionable features of the act, together with its complete text, are published on another page of this issue. After a careful reading every member of the electrical fraternity ought to be imbued with the determination to oppose such radical legislation not only from the standpoint of protecting his or her industry but of protecting the interests of the public as well.

#### Another Example of Unprofitable

##### Political Administration of Hetch Hetchy

OVER the protests of the city engineer and city attorney, the San Francisco supervisors have ratified a contract with the Modesto Irrigation District for furnishing the district with standby electrical service. Under the terms of the contract Modesto will receive standby to the extent of 3,000 kw. for a flat charge of \$4,200 per year and a kilowatt-hour charge of 4.7 mills for energy used.

Obviously this is a fine stroke of business for the Modesto Irrigation District and an exceedingly poor one for San Francisco. Under rate schedules fixed by the California Railroad Commission standby service is furnished on the basis of a price per kilowatt per month or year plus a rate per kilowatt-hour for energy used. For such service from one of the existing utilities Modesto would be forced to pay a rate from \$10 to \$24 per year per kilowatt of demand plus 6 mills per kilowatt-hour. The city engineer estimates that the standby charge alone for a similar service from the Pacific Gas and Electric Company would cost Modesto \$45,000 per year.

Prior to the passage of the contract the Pacific Gas and Electric Company indicated to city officials that it would consider void its obligation to pay for

the 3,000 kw. of plant assigned to Modesto. Therefore the city stands to lose \$96,000—the sum which it ordinarily would receive from the utility for this much capacity—less the \$4,200 which Modesto is willing to pay.

Modesto applied for this service under the terms of the Raker Act which requires that power be served to irrigation districts upon demand for "pumping sub-surface waters for drainage or irrigation or for the actual municipal purposes of municipalities within the districts (which purposes shall not include the sale to private persons or corporations) at such price as will actually reimburse the said grantee for developing and maintaining and transmitting the electrical energy thus sold." Since much of Modesto's electrical business is commercial and since obviously San Francisco is not being reimbursed for its cost of furnishing service, it would seem that the contract itself will be subject to much controversy and possible court action. At any rate its ratification is a typical example of the unbusinesslike, uneconomic and unprofitable administration of a complicated business by a political organization totally lacking in experience or qualifications.

#### Why Always a Gas Range in the Kitchen Scene?

NATIONAL magazines circulating to homes and firesides and known as family magazines are almost as thrilling to the average reader in the advertisements they contain as in the thin lining of stories between them. The reason is not far to seek, since advertisers generally have learned the knack of making their advertisements dramatic, more dramatic sometimes than that which the advertising agency designates when it specifies that its copy stuff shall be "next to live reading matter."

Moreover it is interesting to the electrical man to notice that in all the superb advertisements depicting charming kitchen scenes, it is always a gas range that fills the picture. The inference is all too plain. Gas ranges are already being taken for granted to such an extent that it seems the natural thing to include them in every domestic scene, whether the advertisement be one advertising anything from baking powder to building materials.

This is all very well, but it helps the electric range not a whit. Yet it might help the electric range to a considerable degree without in the least hurting the advertised product, whatever that might be. The presence of an occasional electric range in the kitchen scene should help to accustom the public to the idea that electric ranges, too, may be taken for granted, that they are common to many homes.

Some manufacturers of electrical appliances will say that they are powerless to affect the copy of advertisers of other products. This largely is true. But it is significant likewise that the advertising agency which handles the advertising for an electric manufacturer sometimes handles the advertis-

ing of other products which in turn depict these products in kitchen surroundings, with the inevitable gas range in the offing.

A little diplomacy, a kindly suggestion, perhaps a joking remark has been known to turn even the affairs of state from one channel to another. Is there not a possibility that the agency handling other accounts than that of the electrical manufacturer might not be willing to place a modern electric range, not necessarily of any particular make, in that kitchen back drop which is to be seen behind the particular product advertised in this week's periodical?

### The Princess Who Longs for Our Labor-Saving Devices

ROYALTY has again visited our Western domain. The Crown Prince and Princess of Sweden, in their tour of the United States, spent many days on the Pacific Coast. The hospitality of the West was tendered to them on every hand. But when asked what of all the things she had seen in America Princess Louise liked most, the Crown Princess of Sweden expressed one simple and sincere desire:

"If I could take home to my country one thing for my people, I should like to take your labor-saving devices for the home," she said.

Aside from the unselfishness and deep interest in the welfare of her own people so commendably displayed in her simple expression, the remark is one that should make Americans consider for a moment what these devices mean to their own civilization. For centuries the idea has prevailed and the fact persisted that the best in the world was that which royalty possessed. And yet we may find in this instance that royalty envies for its own people and its own country some of the mechanical servants which are the commonplace equipments of even our humblest homes.

### The Wireman Who "Knocks" the Red Seal Plan

THERE are people who never know when they are well off. Among them may be classed the wireman who, either because he doesn't know any better or because he has the wrong idea as to his job in the world, "knocks" the Red Seal plan to the very customer whose acceptance of it gives him work and bread and butter. Yet, strange as this may seem, there are many wiremen working for electrical contractors who have not yet learned enough about the Red Seal plan to know what it means to them.

Evidently thinking that he was doing the home-owner a favor by doing so, a wireman working on a Red Seal home recently was overheard by a representative of the California Electrical Bureau belittling the plan. "What are you going to all this expense for? You won't need all these outlets in here," the owner was told by the electrician. To the owner the electrician's advice, as a man who presumably knows whereof he speaks, bore weight.

Here lies a big responsibility upon the electrical

contractor and upon the organizations promoting the Red Seal plan. The Bureau has realized its responsibility and plans, it is said, to reach the electricians by addresses at meetings of their unions. But this will not reach them all. The major responsibility still rests with the contractor to acquaint his own men with the Red Seal plan and what it means not only to the electrician himself but to the industry and, more important still, to the home-owner.

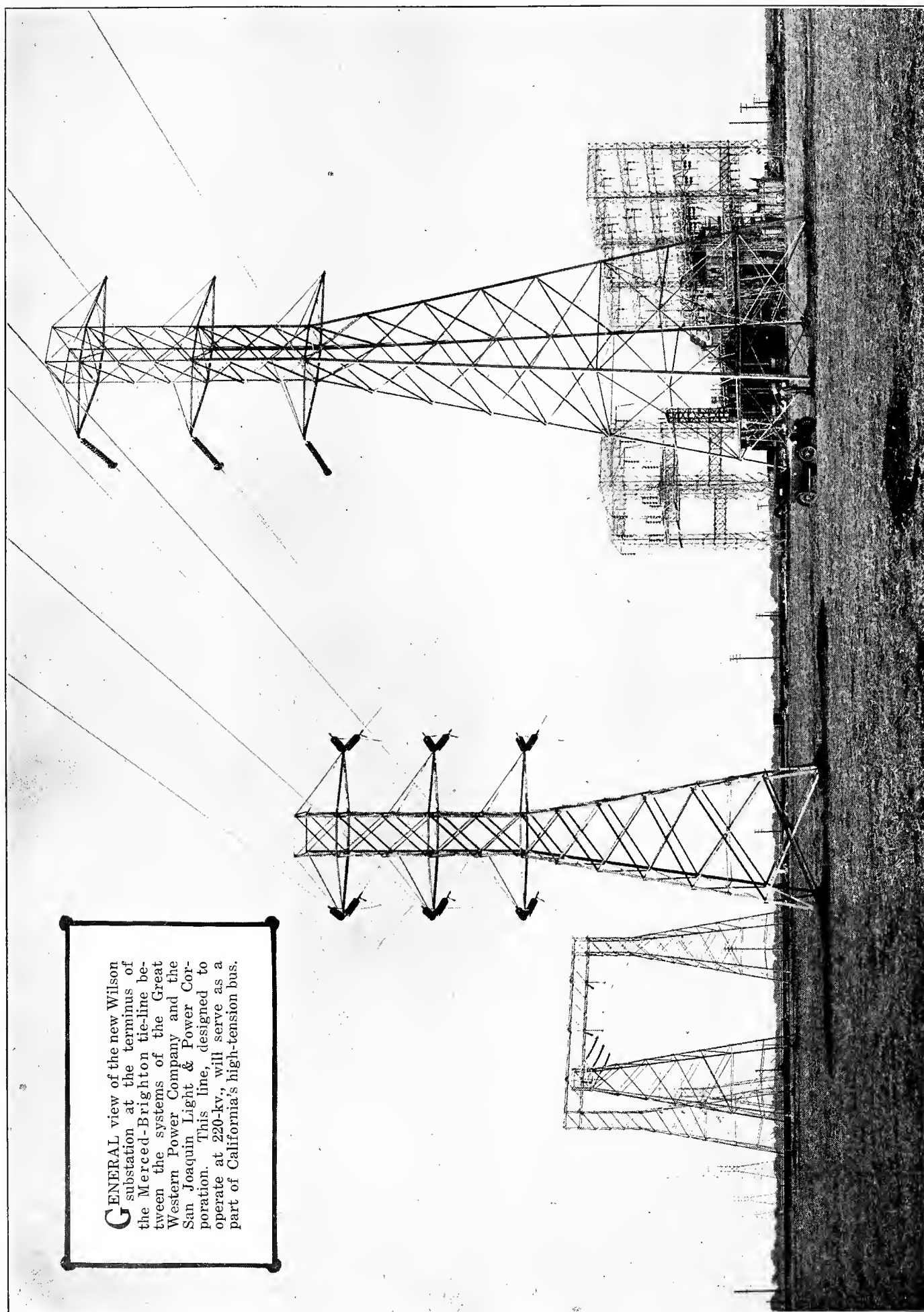
In the final analysis the wireman who talks himself out of a high-class job on the basis of some fancied service to the home-owner is not even doing that home-owner any good. He is robbing him of convenience and the pleasure of having adequate equipment to take care of every electrical need he may wish to supply.

### For the Good of Electric Refrigeration

FROM an economic standpoint, a boom in any industry is just as bad as a surge in a power pipeline, or an abnormal demand on a central station. Strain, even rupture, is likely to follow. A quick consumer-acceptance of a new idea before the industry is organized to meet the demand on so large a scale brings lines of care and worry in the faces of executives all the way down the line in their attempts to cope with such a situation.

The electric refrigeration idea is beginning to present all of the symptoms of such a condition, and it is becoming increasingly evident that the progress in the state of the art must move much faster than would normally be necessary in order that this latest blessing of electricity may not meet with the wrong kind of reaction. The thousand and one necessities to successful exploitation must be provided quickly. What are these necessities? Shall the refrigeration industry, its manufacturers, distributors and service organization be content with the slow process of trial and error, and lag behind the surge of consumer demand, or shall they examine the field and its conditions by study and survey of the many examples already available, and know rather than guess just what is needed and then supply that need?

The editorial staff of the McGraw-Hill electrical publications has undertaken this work as a service to the industry. As this is written, the country is being studied at first hand from the Atlantic to the Pacific, from Mexico to the Canadian line, by personal contact. The central-station officials in all departments, the jobber, dealer, service men are being interviewed with the idea of obtaining an accurate cross-section of the best experience and thought by which, through the correlation of the data obtained, conclusions may be evolved that will constitute a basis for the determination of policies upon definite knowledge and understanding of the needs of the industry. No effort is being spared in order to make of this one of the most comprehensive series of studies ever produced, so that through this service the industry may live up to its best traditions of service to the public.





# Fish Ladder at Baker River Dam Points Way to Solution of Big Problem

**S**ETTLEMENT may come in the conflict of power and fishery interests which for years has centered in the placing of high dams in streams of paramount value in salmon propagation. Experience with the ingenious fish ladders erected at the Baker River plant of the Puget Sound Power & Light Company, on the Baker River, Washington, has shown that there can be no reasonable height limit on dams over which fish cannot be raised unharmed.

Young salmon, from six to seven inches in length, moreover, make a 260-ft. leap from the crest of the Baker River dam to its base at the rate of 10,000 an hour and show no ill effects from their leap. Mature fish on their way to spawning grounds are successfully transported from the base of the dam near the power house to the lake above. These are accomplishments of the state department of fisheries of Washington in co-operation with the Puget Sound Power & Light Company and other interested authorities.

The leap from the summit of the dam to the river bed already has been made by literally millions of young fish with casualties so few as to be negligible. With sockeye salmon running enough fish have made their way from the bottom upward absolutely to set at rest any possibility of doubt as to the success of experiments worked out over a period of two years and of the efficiency of equipment installed at a cost of more than \$75,000 for this purpose, according to state department of fisheries experts.

As far as was known up to the time of this installation no salmon had ever gone over a ladder where the difference in elevation was greater than 49 ft., but with three important power developments under way, each involving a high dam that threatened to end salmon migration in its particular stream, a meeting was called two years ago by institutions closely allied with the fishing industry of the state to discuss this vital problem with the power companies, considerable doubt being expressed as to the possibility of transporting fish beyond the previous record of 49 ft.

The three power developments considered were the Kettle Falls development in eastern Washington, the Priest Rapids development on the Columbia

**C**ONFLICT over the placing of high dams across streams in which fish are wont to go for propagation has agitated both power and fishery interests and occasioned some short-sighted and sentimental legislation. Meanwhile by co-operating with fisheries and government officials the Puget Sound Power & Light Company has solved the problem and proved it by actual test. This article demonstrates that a simple mutual acceptance of responsibility and an application of engineering principles do more to conserve our fisheries than all the legislation the sentimentalists may devise.

River and the Baker River development in Skagit County. Of these three developments, the Baker River was the closest to perfection of its plants. This development involved the construction of a dam 265 ft. high, spanning a gorge in a river which was one of the two sockeye salmon streams in the state of Washington.

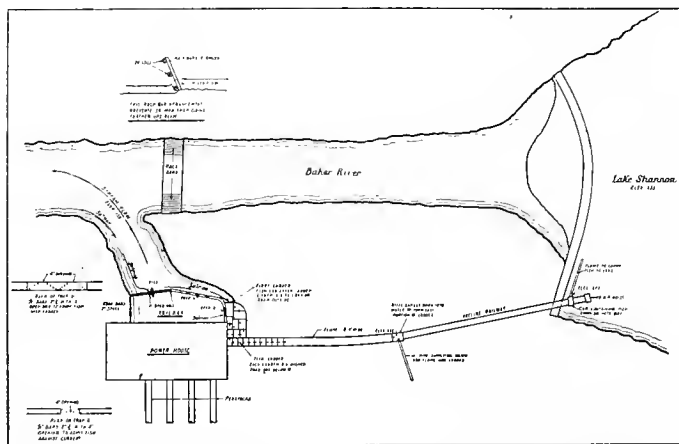
Out of the conference came the formation of a committee composed of representatives of the fish commissions of Washington and Oregon and of the power industries of the two states. The purpose of this committee was to co-ordinate the various ideas in connection

with the problems and to find out whether or not the two industries could live on a stream side by side without undue interference. An executive committee was formed with E. A. Simms, chairman of the state fish commission of Washington, as chairman of the committee and with Prof. John Cobb, dean of the fisheries department of the university, as secretary. This committee raised the sum of \$5,000 which was apportioned between the two states and between the various power companies in both states.

After a number of meetings of the committee, a plan of action was decided upon by means of which certain experiments could be performed which might assist in the solution of the problems involved. In the meantime, however, the progress of the plans for the Baker River development was developing to such an extent that the further conducting of experiments was out of the question insofar as they could be expected to be useful in connection with this particular development.

It became necessary, therefore, for the engineers of the power company to go directly to the state fish commission and ask for help in designing the necessary forebays, traps, fish ladder and other devices necessary if salmon were to be transported successfully over the Baker River dam. This appeal was made directly to Mr. Simms and to Charles Pollock, state supervisor of fisheries, who in turn assigned L. E. Mayhall, state superintendent of hatcheries, to confer with W. D. Shannon, general superintendent, division of construction and engineering, Stone & Webster, and the power company's engineers in the hope the problems could be solved.

It then developed that there were a number of conflicting ideas in regard to the whole knowledge salmon could be retained at each point of its journey studies that the problem would have to be handled largely in an engineering manner, using such knowl-



Drawing showing relative locations of the various items making up the fish ladder system, including the bar to keep the fish from going up to the foot of the dam, diverting them to the tailbay, up the steps of the ladder, flume and inclined railway to the lake above.

edge as the department of fisheries could furnish. With the co-operation of Mr. Pollock and Mr. Mayhall, various devices were worked out, and, after acceptance by the executive committee, were quickly constructed in connection with the Baker River development.

### Must Retain Fish in the Ladder

During the course of the construction and while some of the experiments were being made with a run of steelhead salmon, it developed that if the salmon could be retained at each point of its journey in the fish ladder, one of the difficulties of handling the fish would be solved. There was developed, therefore, a trap, which was later christened "the Mayhall trap," by means of which a salmon could glide from one pool of the ladder to another, but in no way could it return.

This has led the engineers to believe that the statement that fish could not negotiate a ladder higher than 49 ft. was purely a myth, and it is now believed that it is a simple matter, by using the method in use at Baker River, to carry fish to almost any reasonable height. It was also believed at first that the various jumps in the fish ladder should be made a maximum. In such case a salmon might have to try several times before making the jump. The engineers believed, however, that if the jump could be made the minimum it would then make the jump the first time and so conserve its strength that it could make an indefinite number of jumps in a properly constructed ladder.

When it is considered that there is a difference of 600 ft. between tide water and Baker Lake and that in days gone by salmon would negotiate this distance in about four days, there was no reason to believe that if a fish ladder were constructed by easy stages, a fish could not negotiate the same height. For this reason a ladder was constructed

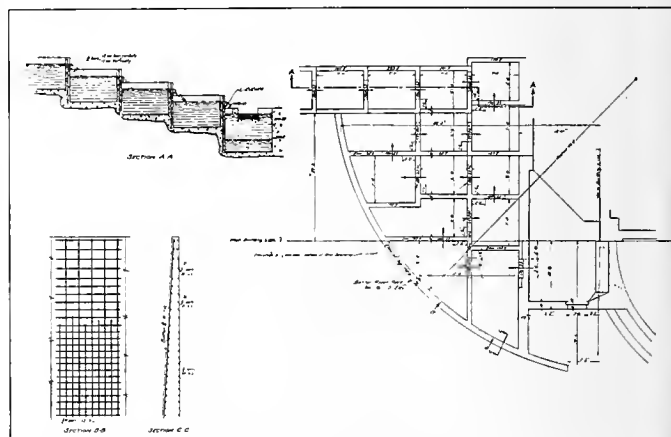
with the difference in elevation of only two feet, with the result that the salmon expends very little effort in negotiating the jump from one pool to another.

Another important feature of the ladder is that each pool has sufficient size so that the salmon can, if it wishes, rest a while before making another jump. The whole problem has simply been an engineering application of old ideas.

### The Plan as Developed at Baker River

The entire scheme of the Baker River ladder consists of a huge forebay where a fish can fight the swift water and when tired enter into the traps on the upstream side of the fishbay, and, once entering one of these traps, cannot return. The ladder begins at this point and goes by easy stages up the canyon walls until it reaches a series of flumes built along the river channel. The length of the flume is about 700 ft. The last step of the ladder has for a pool a movable car. When a quantity of fish of sufficient number has negotiated the last pool of the ladder, the car, which is fitted with a door, is then pulled up a steep incline where the salmon, still in water, are emptied into a trough leading to Lake Shannon above. The salmon, therefore, do not at any time leave the water and are simply transported in a large tank full of water to the lake above.

During the spring of this year, the last half of the steelhead salmon run was successfully handled over the ladder. During the third week of June the first of the sockeye salmon arrived and quickly found their way into the ladder. After being placed in the lake above, the fish took just about three days to reach the trap at Baker Lake where the government catches them and from which they are towed in live boxes to the upper end of Baker Lake.



Detail of the fish ladder at its entrance, with sections showing construction plan and rack-bar at the entrance which keeps fish from leaving the ladder.

Here the salmon are allowed to ripen and are later spawned, the eggs being hatched in the United States hatchery on the shore of the lake.

### Over the Top

Another very interesting problem in connection with Baker River dam was that as to just how the young migratory salmon would behave in going

# Journal of Electricity

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## "Circuit Riders"

"CONVENTION Circuit Riders" is a term which might be aptly applied to the members of the editorial staffs of technical journals. They probably attend more conventions than any other man in the industry which their paper serves. Theirs is the job of bringing back a permanent record so that the important thought brought out in the convention sessions will not be left to memory alone.

During the fortnight just closed two important conventions have taken place in the Western states. The "Circuit Riders" have attended both. In the next issue of the Journal of Electricity will be a complete report of the Pacific Coast convention of the American Institute of Electrical Engineers held in Salt Lake City, Sept. 6-10. The outstanding contributions to the art presented in the many papers as well as the most interesting parts of the discussions will be digested.

At Glenwood Springs also the Rocky Mountain Division of the N.E.L.A. and the Colorado Public Service Association held their joint convention Sept. 13-16. Once again the "Circuit Riders" were on the job and the papers and discussion relating to the problems of the electrical industry in the Rocky Mountain states will be made the subject of a complete and comprehensive report.

Both of these reports will reflect the advancement of the industry and will present its ideals and aspirations. Both will be well worth reading.

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# EDITORIAL

## Baker Fishway Points the Way

POWER and fish interests alike rejoice at the success of the fishway at the 260-ft. Baker River dam of the Puget Sound Power & Light Company, as described in this issue. Here is the first instance in which the spawning cycle of migratory fish has been unimpeded by a high dam. In the spring of this year a few thousand mature sockeye salmon were passed over the dam to the spawning grounds above, and several times as many thousands of offspring of a similar, prior run proceeded down on their way to the sea, which is the natural, immutable law of the salmon in its life cycle.

It has been alleged, and generally is believed to be true, that salmon will not of their own accord ascend a fish ladder of an elevation greater than fifty feet. When the fishery interests of the Northwest saw that the power interests were contemplating high-dam developments on spawning rivers this fact caused some alarm, and a potent protest was set in motion. But the fish men found the power companies alive to the importance of the fish industry, cognizant of the spawning problem, and eager to work out a solution in co-operation with state officials and commercial fishermen. Hydroelectric engineers felt that a mechanical lift could be used successfully; fishermen and game commissioners harbored some doubts. It was agreed that the problem was only about one-half engineering, in that the other half was how to get the fish to enter the mechanical device. Engineers and ichthyologists put their heads together, some experiments were made, and finally W. D. Shannon, superintendent, Stone & Webster, Seattle, builder of the Baker dam, working with fish and game commissioners of the state, demonstrated in actual practice that the obstacle is not insurmountable.

The Baker fishway applies a number of new principles in fishway design and operation. In the first place it requires the fish to swim to an elevation of only about forty feet and then carries them in a tank of water the balance of the height of the dam and dumps them into the reservoir above. In the second place the fishway entrance is at the power house, or some thousand feet below the dam, and to keep the fish from nosing up to the base of the dam a rack is stretched across the river just above the power house. Further, the swift tail water from the wheels is used to attract the fish to the entrance to the fishway, which is adjacent to this tail water. Lastly, the ladder part of the fishway has steps of only two-feet elevation requiring a minimum, and therefore a less tiring jump, and in addition each step is equipped with a trap device

to keep the fish from drifting back down once it has entered the ladder. This latter feature of the design has led to some speculation as to whether or not the fish of their own accord might proceed the entire distance over the dam if given a sufficiently flat grade, but such a ladder would present additional engineering problems and probably would be as expensive as the present hoisting device.

The significant thing about the Baker River success is that the fish are diverted from their natural course upstream, are practically trapped, and are delivered without injury to the stream above the dam. In this lies the hope of ultimate solution of any similar problem in the future, which means that hydroelectric development on spawning rivers may continue without harming the great fish industry on the Pacific Coast. What has been accomplished on Baker River can be accomplished elsewhere. Each problem will be an individual one; but each can be worked out by taking into consideration the nature of the stream and the habits of the fish running in it, and then building suitable devices to meet the conditions and operating the whole to suit the characteristics of the run.

Some mention of the other and equally important half of the problem should be made—that of getting the young fish safely down below the dam again when they migrate to the sea. Some experts had held the opinion that a drop over the dam would not hurt these fry; others thought they might go through the runners of the water wheels and live to be caught or spawn again; still others opined that both were wrong. But no one knew, and it remained for the Baker experiment to disprove or verify at least one theory. What has been proved on the Baker River is that the young fish in schools actually do make the 260-ft. drop in a column of spill-water over the dam without injury. Thus has the spawning cycle been completed, and thus have been settled several important points of a controversy that two years ago seriously threatened hydroelectric development in the Northwest.

## Oregon to Vote on State-Owned Power System Run by "Housewives"

OREGON voters will find on the ballot in that state on Nov. 2 an amendment to the state constitution labeled "Water and Power Bonding Amendment." This measure was sponsored by the Housewives' Council, Inc., of Portland and only received a place on the ballot after a court fight to determine whether or not sufficient signatures had been secured to initiate it. The proposed amendment is patterned in most respects after the famous or infamous California \$500,000,000 Water and

Power Act which has been defeated twice and which will be voted on for a third time at the coming election. In some respects, however, the Oregon legislation is even more impracticable and visionary.

In the first place the Oregon amendment names the five members who will constitute the Water and Power Board for the first four years, the majority of whom will be in control. Not one of the individuals named has any experience to qualify him or her to administer an enterprise concerned with power, irrigation and domestic water projects. From the standpoint of one familiar with the intricacies of the electric light and power business this is amusing. From the standpoint of the taxpayers who will be forced to make up the deficits and pay for mistakes it is tragic. Under private management such a business could be successful only when managed by men of long experience who had demonstrated marked executive and organizational ability. The character of executives developed in the electrical industry amply demonstrates this point. To invest such a board with the unlimited power to engage in the business contemplated by the provisions of the amendment and to place in inexperienced hands the expenditure of the \$52,944,000 plus such other money as the board should need would be folly of a character beyond the wildest dream of a 1905 Socialist.

Some of the other objectionable features of the act, together with its complete text, are published on another page of this issue. After a careful reading every member of the electrical fraternity ought to be imbued with the determination to oppose such radical legislation not only from the standpoint of protecting his or her industry but of protecting the interests of the public as well.

#### Another Example of Unprofitable

##### Political Administration of Hetch Hetchy

OVER the protests of the city engineer and city attorney, the San Francisco supervisors have ratified a contract with the Modesto Irrigation District for furnishing the district with standby electrical service. Under the terms of the contract Modesto will receive standby to the extent of 3,000 kw. for a flat charge of \$4,200 per year and a kilowatt-hour charge of 4.7 mills for energy used.

Obviously this is a fine stroke of business for the Modesto Irrigation District and an exceedingly poor one for San Francisco. Under rate schedules fixed by the California Railroad Commission standby service is furnished on the basis of a price per kilowatt per month or year plus a rate per kilowatt-hour for energy used. For such service from one of the existing utilities Modesto would be forced to pay a rate from \$10 to \$24 per year per kilowatt of demand plus 6 mills per kilowatt-hour. The city engineer estimates that the standby charge alone for a similar service from the Pacific Gas and Electric Company would cost Modesto \$45,000 per year.

Prior to the passage of the contract the Pacific Gas and Electric Company indicated to city officials that it would consider void its obligation to pay for

the 3,000 kw. of plant assigned to Modesto. Therefore the city stands to lose \$96,000—the sum which it ordinarily would receive from the utility for this much capacity—less the \$4,200 which Modesto is willing to pay.

Modesto applied for this service under the terms of the Raker Act which requires that power be served to irrigation districts upon demand for "pumping sub-surface waters for drainage or irrigation or for the actual municipal purposes of municipalities within the districts (which purposes shall not include the sale to private persons or corporations) at such price as will actually reimburse the said grantee for developing and maintaining and transmitting the electrical energy thus sold." Since much of Modesto's electrical business is commercial and since obviously San Francisco is not being reimbursed for its cost of furnishing service, it would seem that the contract itself will be subject to much controversy and possible court action. At any rate its ratification is a typical example of the unbusinesslike, uneconomic and unprofitable administration of a complicated business by a political organization totally lacking in experience or qualifications.

#### Why Always a Gas Range in the Kitchen Scene?

NATIONAL magazines circulating to homes and firesides and known as family magazines are almost as thrilling to the average reader in the advertisements they contain as in the thin lining of stories between them. The reason is not far to seek, since advertisers generally have learned the knack of making their advertisements dramatic, more dramatic sometimes than that which the advertising agency designates when it specifies that its copy stuff shall be "next to live reading matter."

Moreover it is interesting to the electrical man to notice that in all the superb advertisements depicting charming kitchen scenes, it is always a gas range that fills the picture. The inference is all too plain. Gas ranges are already being taken for granted to such an extent that it seems the natural thing to include them in every domestic scene, whether the advertisement be one advertising anything from baking powder to building materials.

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contractor and upon the organizations promoting the Red Seal plan. The Bureau has realized its responsibility and plans, it is said, to reach the electricians by addresses at meetings of their unions. But this will not reach them all. The major responsibility still rests with the contractor to acquaint his own men with the Red Seal plan and what it means not only to the electrician himself but to the industry and, more important still, to the home-owner.

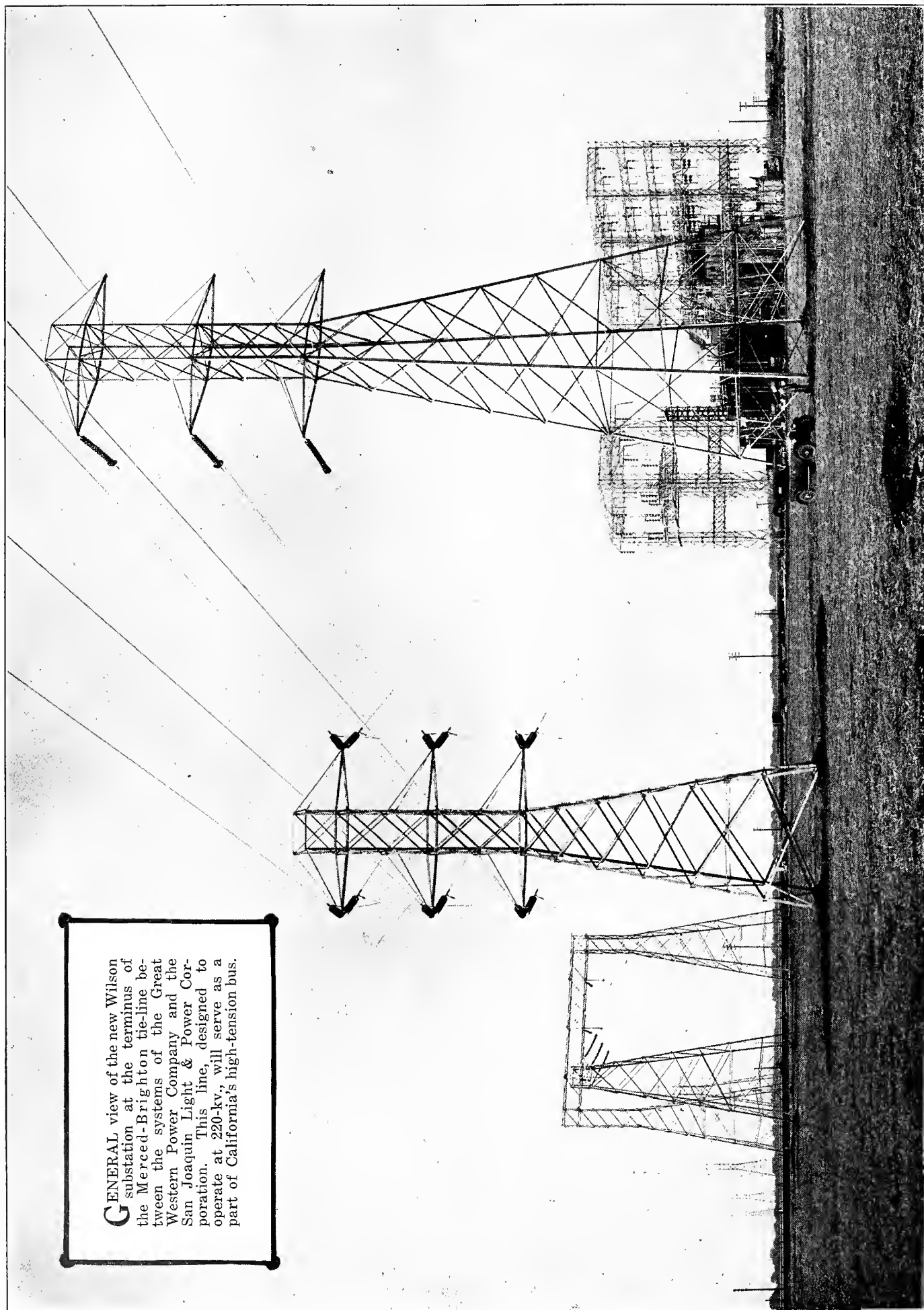
In the final analysis the wireman who talks himself out of a high-class job on the basis of some fancied service to the home-owner is not even doing that home-owner any good. He is robbing him of convenience and the pleasure of having adequate equipment to take care of every electrical need he may wish to supply.

**For the Good of  
Electric Refrigeration**

**F**ROM an economic standpoint, a boom in any industry is just as bad as a surge in a power pipeline, or an abnormal demand on a central station. Strain, even rupture, is likely to follow. A quick consumer-acceptance of a new idea before the industry is organized to meet the demand on so large a scale brings lines of care and worry in the faces of executives all the way down the line in their attempts to cope with such a situation.

The electric refrigeration idea is beginning to present all of the symptoms of such a condition, and it is becoming increasingly evident that the progress in the state of the art must move much faster than would normally be necessary in order that this latest blessing of electricity may not meet with the wrong kind of reaction. The thousand and one necessities to successful exploitation must be provided quickly. What are these necessities? Shall the refrigeration industry, its manufacturers, distributors and service organization be content with the slow process of trial and error, and lag behind the surge of consumer demand, or shall they examine the field and its conditions by study and survey of the many examples already available, and know rather than guess just what is needed and then supply that need?

The editorial staff of the McGraw-Hill electrical publications has undertaken this work as a service to the industry. As this is written, the country is being studied at first hand from the Atlantic to the Pacific, from Mexico to the Canadian line, by personal contact. The central-station officials in all departments, the jobber, dealer, service men are being interviewed with the idea of obtaining an accurate cross-section of the best experience and thought by which, through the correlation of the data obtained, conclusions may be evolved that will constitute a basis for the determination of policies upon definite knowledge and understanding of the needs of the industry. No effort is being spared in order to make of this one of the most comprehensive series of studies ever produced, so that through this service the industry may live up to its best traditions of service to the public.





# Fish Ladder at Baker River Dam Points Way to Solution of Big Problem

**S**ETTLEMENT may come in the conflict of power and fishery interests which for years has centered in the placing of high dams in streams of paramount value in salmon propagation. Experience with the ingenious fish ladders erected at the Baker River plant of the Puget Sound Power & Light Company, on the Baker River, Washington, has shown that there can be no reasonable height limit on dams over which fish cannot be raised unharmed.

Young salmon, from six to seven inches in length, moreover, make a 260-ft. leap from the crest of the Baker River dam to its base at the rate of 10,000 an hour and show no ill effects from their leap. Mature fish on their way to spawning grounds are successfully transported from the base of the dam near the power house to the lake above. These are accomplishments of the state department of fisheries of Washington in co-operation with the Puget Sound Power & Light Company and other interested authorities.

The leap from the summit of the dam to the river bed already has been made by literally millions of young fish with casualties so few as to be negligible. With sockeye salmon running enough fish have made their way from the bottom upward absolutely to set at rest any possibility of doubt as to the success of experiments worked out over a period of two years and of the efficiency of equipment installed at a cost of more than \$75,000 for this purpose, according to state department of fisheries experts.

As far as was known up to the time of this installation no salmon had ever gone over a ladder where the difference in elevation was greater than 49 ft., but with three important power developments under way, each involving a high dam that threatened to end salmon migration in its particular stream, a meeting was called two years ago by institutions closely allied with the fishing industry of the state to discuss this vital problem with the power companies, considerable doubt being expressed as to the possibility of transporting fish beyond the previous record of 49 ft.

The three power developments considered were the Kettle Falls development in eastern Washington, the Priest Rapids development on the Columbia

***C**ONFLICT over the placing of high dams across streams in which fish are wont to go for propagation has agitated both power and fishery interests and occasioned some short-sighted and sentimental legislation. Meanwhile by co-operating with fisheries and government officials the Puget Sound Power & Light Company has solved the problem and proved it by actual test. This article demonstrates that a simple mutual acceptance of responsibility and an application of engineering principles do more to conserve our fisheries than all the legislation the sentimentalists may devise.*

River and the Baker River development in Skagit County. Of these three developments, the Baker River was the closest to perfection of its plants. This development involved the construction of a dam 265 ft. high, spanning a gorge in a river which was one of the two sockeye salmon streams in the state of Washington.

Out of the conference came the formation of a committee composed of representatives of the fish commissions of Washington and Oregon and of the power industries of the two states. The purpose of this committee was to co-ordinate the various ideas in connection

with the problems and to find out whether or not the two industries could live on a stream side by side without undue interference. An executive committee was formed with E. A. Simms, chairman of the state fish commission of Washington, as chairman of the committee and with Prof. John Cobb, dean of the fisheries department of the university, as secretary. This committee raised the sum of \$5,000 which was apportioned between the two states and between the various power companies in both states.

After a number of meetings of the committee, a plan of action was decided upon by means of which certain experiments could be performed which might assist in the solution of the problems involved. In the meantime, however, the progress of the plans for the Baker River development was developing to such an extent that the further conducting of experiments was out of the question insofar as they could be expected to be useful in connection with this particular development.

It became necessary, therefore, for the engineers of the power company to go directly to the state fish commission and ask for help in designing the necessary forebays, traps, fish ladder and other devices necessary if salmon were to be transported successfully over the Baker River dam. This appeal was made directly to Mr. Simms and to Charles Pollock, state supervisor of fisheries, who in turn assigned L. E. Mayhall, state superintendent of hatcheries, to confer with W. D. Shannon, general superintendent, division of construction and engineering, Stone & Webster, and the power company's engineers in the hope the problems could be solved.



over the dam. Very early in the discussion the United States commissioner of fisheries, Henry O'Malley, made the statement that from his experience he would not worry about young salmon going over the dam. While this involved more than a 200-ft. drop Mr. O'Malley seemed to think that the young fish would make it nicely. His prediction proved true. It is indeed a pretty sight to see the young migrators going over the dam and appearing at the power house about 1,000 ft. below in as



Young migrating salmon tumble by thousands down the 260-ft. waterfall in front of the Baker River dam and are unharmed.

healthy a condition as one could wish. Mr. Russell, the bureau of fisheries' representative in the Northwest, said that this was the first time he had ever had the opportunity to see young migratory salmon and to study them in such favorable circumstances.

One of the gates was left open during the run of young salmon in June. A spectator could stand on the bridge above the gate and see what looked like a bushel basket full of young fish go out through the opening, wriggle their fins and tails in the spray and sunlight so that they were all easily visible and plunge with the heavy stream of water 260 ft. to the pool below. These young salmon, from six to seven inches long, made a beautiful sight as they fell in the spray in front of the dam.

Uninjured by the Leap

The salmon fell in a deep pool of water below and were apparently uninjured in any way. Occasionally a young salmon would jump out of the waterfall and would be injured against the dam, but Mr. Mayhall declares that "the percentage of loss is very small."

It was estimated during the heavy run that the young salmon were passing over the dam at the rate of about 10,000 an hour, so it may be seen easily that many millions of young migratory fish have successfully passed over the dam this year.

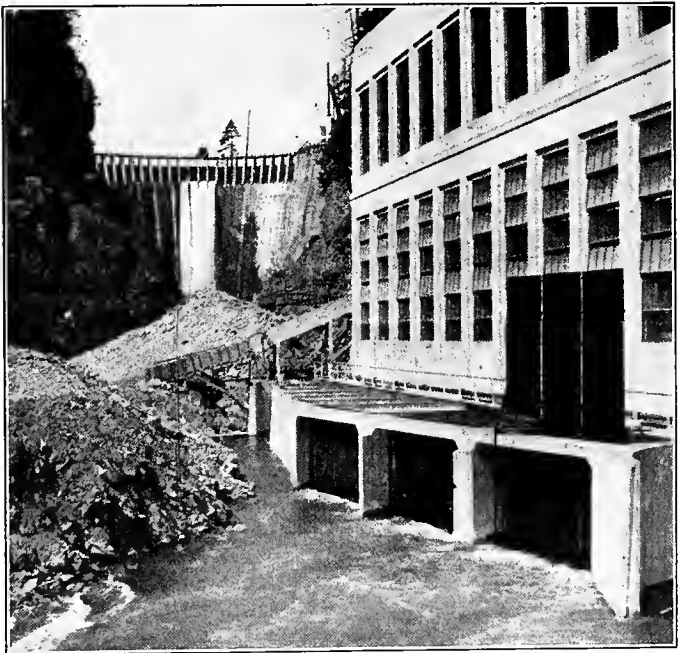
Mr. Mayhall further stated in his report to the state supervisor of fisheries that "the fish are visible passing over the rack at the power house. They are still in schools, active, handle themselves well in the swift current and from all appearances are no worse off as a result of their trip over the dam."

The photographs and drawings accompanying this article show in detail the position of the trap placed across the river which prevents the young salmon from going beyond the entrance to the fish ladder and also show in some detail the fish ladder itself.

What it Means to Both Industries

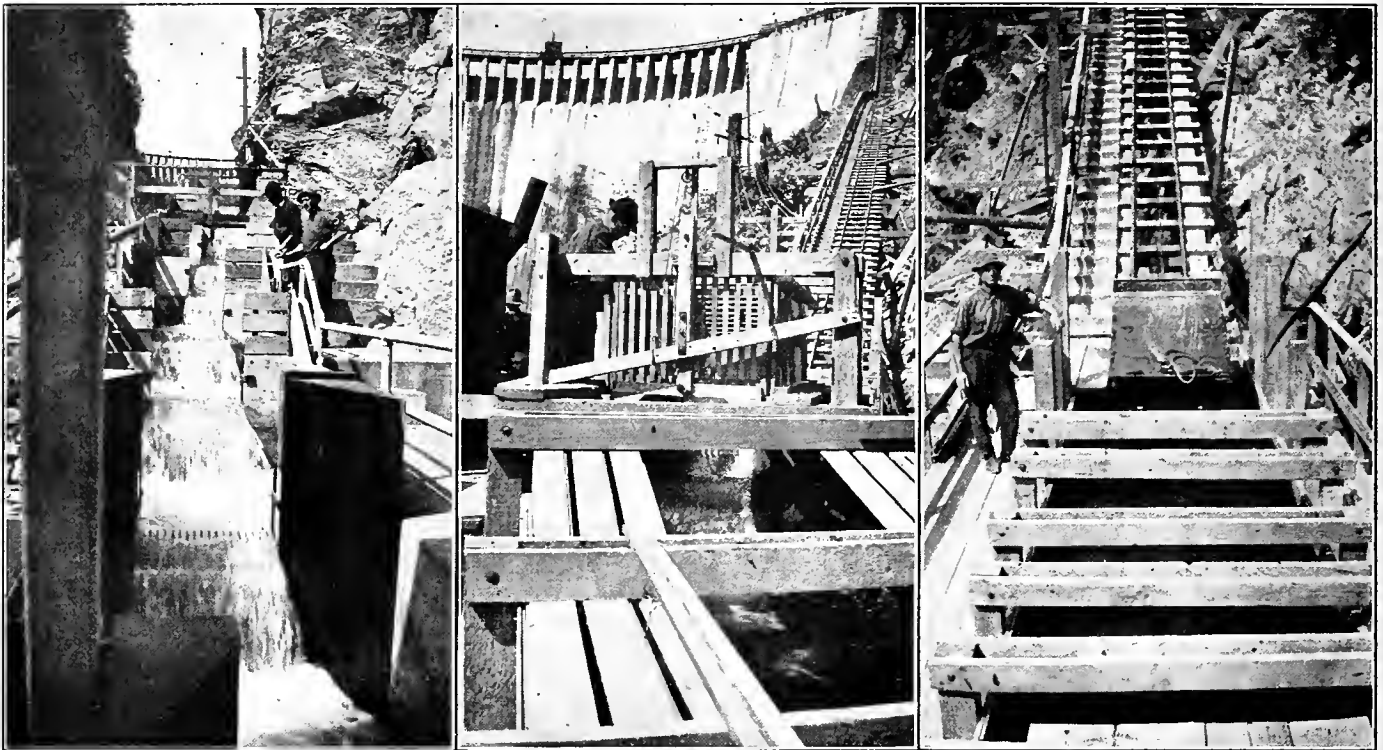
The success of the whole enterprise means a great deal to both the salmon and the power industries of not only this state but of the whole country, fisheries experts have declared. This is the first time so far as is known that the migratory fish have been successfully transported over a high dam. It is predicted that no longer will the power companies be restrained from building as high a dam as is needed across any of our salmon streams and no longer will the great salmon industry of the state be menaced as a result of such power dams.

The conclusion of the successful experiments at Baker River and the installation of a successful



Salmon enter the tailbay of the Baker River power house through the openings in the rack-bars and thence enter the latter, seen starting around the corner, to get to the top of the dam, visible through center.

means of getting migratory fish over a high dam in the future will be pointed out by the power and salmon industries as what can be done. Because of this successful installation it is expected that the two great industries of the West will work in



Up the steps of the fish ladder (shown in the first picture, left), go the salmon, two feet at a step. At the top they enter a flume which carries them to the last step, a step which takes them into the cage of the inclined railway, as shown in the center photograph. Fish and water are then elevated as shown at the right up the inclined railway to the dam and dumped into the lake.

harmony toward the development of the region's great assets.

Oregon has dropped out of the picture and has gone into experiments of its own. It remained for the people of the state of Washington to witness the first successful effort to transport fish over high dams. It was the privilege of one of Washington's power companies to be the pioneer in this development.

Great credit has been given by the fisheries industry to the state fisheries department of Washington for its co-operation with the power company in the solution of the problems involved. Credit also has been given the power company's engineers in attacking a problem entirely outside of the ordinary knowledge of engineering and solving it in such a way as to be of great benefit to the people of the state.

The success of the fish ladder installation at the Baker River dam suggests that co-operation between power company engineers, fisheries and government officials may result in a satisfactory solution of other similar problems. It suggests also that legislation preventing development of streams for power generation because such streams happen to be the usual haunt of spawning fish at certain seasons of the year is legislation which is wasteful of the natural resources of a state. Such legislation is usually inspired by well-meaning but misinformed people and supported by those of tender sympathies and by sportsmen whose concept of the welfare of the state is measured in terms of their own "catch" of fish.

Patience and good engineering thus may bring

about a solution of the problem which those who have fostered legislation have only made more difficult to handle, meanwhile curtailing necessary power development. Indeed one of the most significant things about the Baker River experience has been Mr. Mayhall's report to the government, in which he has stated that "the power company deserves great credit for the consistent and conscientious effort it has contributed in making this fishway problem a success."

**Electric Wire Manufacture in Japan.**—There are eleven companies in Japan manufacturing electric wire, according to U. S. Commerce Reports. Their combined capital is estimated at \$16,145,000 with individual capitalizations ranging from \$66,300 to \$6,231,000. The manufacturers have shown particular skill in the production of various lines of small and medium gage copper wire, both bare and insulated. In 1909 the production of wire and cable totaled \$2,941,500 in value; it increased to \$24,156,500 in 1919, and amounted to \$43,736,300 in 1924. A great stimulus was received by this industry as a result of the decreased imports of foreign-made wire during the World War; production of wire and cable steadily increased. Although the manufacture of submarine telegraph and telephone cable has not been developed so greatly as has that of wire, it is believed that cable of this kind for home use ultimately will be manufactured entirely in Japan. Domestic manufacturers of electrical wire not only supply practically the entire home consumption, but export a considerable quantity to China, Kwantung leased territory, Hongkong and the Dutch Indies.



# Proposed Oregon Water and Power Amendment

A MEASURE proposing to put the state of Oregon in the electric light and power business will be voted upon by the electorate of that state at the general election Nov. 2, 1926. The proposed amendment was sponsored by the Housewives' Council of Portland and achieved a place on the ballot only after a court fight to determine whether or not sufficient signatures had been secured to initiate it.

The amendment is patterned in many respects after the \$500,000,000 California Water and Power Act which has been twice defeated by the voters of that state and which will appear on the ballot for a third time this November. Some of the more objectionable features of the California legislation have been eliminated but in certain respects the Oregon amendment is even more visionary.

The Oregon Water and Power Amendment creates a board of five members with majority control. It goes even further by naming the members to hold office for the first five years. None of those named has had any experience to qualify for the post of administering so intricate a business as the development of water power projects and the generation of hydroelectric power.

This board would be clothed with unlimited and unrestricted power "to do any and all things necessary or convenient for carrying out the purposes of the amendment. It would be responsible to no one. It could withdraw from appropriation and could use all water and materials in or on the lands of the state. Thus it would have complete control of all natural resources. It could go into any kind of business it considered necessary. It would have the right to acquire property by eminent domain. In

venturing into any project, hydroelectric, irrigation or domestic supply, no matter how large a sum of money involved, the board would be required to do nothing more than make an investigation and file with itself a report made by its own employees under its supervision. It could then spend any or all of the moneys provided by the amendment for this project.

The measure provides that the board shall have the power to sell bonds of the state to the extent of 5 per cent of the assessed valuation or approximately \$52,944,000 at the present time. It would have the further right to issue and sell an unlimited amount of certificates of indebtedness secured by the property and revenue of specific projects. There are no provisions in the act regulating the manner in which these securities would be sold. The bonds and interest by the terms of the amendment would be direct obligations of the state. Were revenues from the operations of the board insufficient to pay interest and retirement charges on the bonds, these could be met with money from the general fund. The board could require tax levying bodies each year to levy a tax to provide funds for meeting deficits. Also the board would be authorized to sell bonds for the purpose of meeting deficits in operating and maintenance charges and for paying interest and principal on bonds already issued.

All moneys derived from the sale of bonds or certificates of indebtedness and from revenues derived from the operation of projects would be placed in a "Water and Power Fund" the moneys from which would be subject to withdrawal by the board at will.

The full text of the proposed amendment is as follows:

## Section 1

It is hereby declared to be the policy and purpose of the State to conserve, develop and control the waters of the State of Oregon for the use and benefit of the people by publicly owned and operated utilities.

## Section 2

The Oregon Water and Power Board, hereinafter called the "Board," is hereby established, composed of five members, who shall be elected from the state at large by a vote of the people without regard to political affiliation or nomination, and who shall be citizens of the United States and of the State of Oregon, and shall have been residents of the State of Oregon for a period of five years immediately preceding their election. Members of the board shall hold office for a period of six years, two of whom shall be elected at the general election for two successive elections and one of whom shall be elected at the general election on the sixth year, with the exception of the members of the first board who shall be Waldo Anderson, Albany, Ore.; J. T. Rorick, The Dalles, Ore.; Frank M. Gill, Dufur, Ore.; Kate Bonham, Portland, Ore., and Dan Kellaher, Portland, Ore., whose respective terms shall be determined by lot between themselves, two of whom shall hold office for two years, two for four years, and one for six years.

The members of the board named herein shall serve without pay, but shall receive their necessary expenses. Members of the board shall execute to the State of Oregon such bond as the State Bond Commission may require, the premium therefor to be paid as other expenses of the commission.

In case of vacancy on the board, the suc-

cessor to such vacancy shall be chosen by the remaining member or members of the board, and such member so chosen shall hold office until the next general election or until his successor shall have been elected and qualified.

Any member or members of the board may be removed by recall as provided in the case of other elective officers of the state.

A majority of the board shall constitute a quorum for the transaction of business.

## Section 3

The board shall have power:

(a) To construct or acquire by purchase, lease, condemnation, gift or other legal means, lands, water, water rights, easements, electric energy, and also to construct, complete and operate works, dams, reservoirs, canals, pipe lines, conduits, power houses, transmission lines, structures, roads, railroads, machinery and equipment, and any other property necessary or convenient for the purpose of the Article, and to do any and all things necessary or convenient for the conservation, development, storage and distribution of water, and the generation, transmission and distribution of electric energy and water for irrigation and domestic purposes: PROVIDED, HOWEVER, no plant shall be purchased for a consideration of more than five hundred thousand dollars until such purchase shall have been approved by a vote of a majority of the legal electors of the state voting at a General Election.

(b) To purchase, acquire, produce or otherwise provide facilities, materials and supplies, raw or finished, or any property or thing necessary or convenient to the accomplishment of the purpose of this Article.

(c) To supply water for irrigation or domestic purposes, or electric energy, or both, to the state, political subdivisions thereof and other users, and subject to the provisions of this Article, to prescribe the terms of contracts, and fix a price therefor and collect the same.

(d) To use the water and the lands of the state or any material therein or thereon and to require the reservation from the sale or other disposition of such land and material as in the opinion of the board will be required for the purposes of this Article.

(e) To reserve water from appropriation for such periods as it may provide.

(f) In the name of the State of Oregon to apply for and accept under the provisions of the laws of the United States, or of any state, grants, permits, licenses and privileges in the opinion of the board necessary for the accomplishment of the purposes of this Article.

(g) To co-operate and contract with political subdivisions of this state, with the United States and other states concerning the conservation and use of interstate and other waters for the generation and use of electric energy, irrigation or other purposes, in the acquisition, construction, completion, maintenance and operation of works necessary or convenient for the accomplishment of the purposes of this Article.

(h) To acquire or construct for political subdivisions distributing systems for water or electric energy bought from the state upon terms that, in the opinion of the board, will repay to the state within not to exceed thirty years the cost thereof including interest. The title to or interest of the state in such sys-

terms shall vest in the political subdivision when paid for.

(i) To sue and be sued, and to exercise in the name of the State of Oregon the power of eminent domain for the purpose of acquiring any property or the use or joint use of any property deemed by the board necessary for the purposes of this Article, said power of eminent domain to be exercised as provided under the general laws of the state.

(j) To provide itself with suitable office and field facilities and to appoint and define the duties and fix the compensation of such expert and technical officers, legal and clerical assistants, and other employees as it may require.

(k) To define projects and to adopt rules and regulations to govern their activities.

(l) To exercise all powers needful for the accomplishment of the purpose of this Article and such additional powers as may be granted by the Legislature.

#### Section 4

Bonds of the State of Oregon, not to exceed 5 per centum of the assessed valuation of the state may be issued and sold from time to time to carry out the purpose of this Article and the full faith and credit of the State of Oregon is hereby pledged for the payment of the principal of said bonds as the same mature, and the interest accruing thereon as the same falls due.

#### Section 5

Bonds herein authorized shall be issued and sold by the Oregon Water and Power Board as herein provided, and shall be serial bonds, payable in not more than fifty years from the time of issuance, and shall be in such form or forms and denomination or denominations and subject to such terms and conditions of issue, conversion, redemption, maturities, payment, and rate or rates of interest, not exceeding six per cent per annum, payable semi-annually, and time or times of payments of interest as the board from time to time, at or before the issuance thereof, may prescribe. The principal and interest thereof shall be payable in United States Gold Coin. Said bonds shall be signed by the State Treasurer and countersigned by the Governor and Secretary of State by their engraved signatures, and the Great Seal of the State of Oregon shall be impressed thereon. All coupons thereto shall be signed by the State Treasurer, by his engraved or lithographed signature. The board shall pay from funds available to it, the expenses of issuing and selling such bonds and the necessary expenses of the board in connection therewith.

Bonds herein authorized may from time to time be offered as a popular loan under such regulations prescribed by the board from time to time as will in its opinion give the people, as nearly as may be, an equal opportunity to participate therein, but the board may make allotment in full upon application for smaller amounts of bonds in advance of any date which it may set for the closing of subscriptions and may reject or reduce allotments upon applications, upon later applications and applications for larger amounts, and may reject or reduce allotments upon applications from incorporated banks and trust companies, for their own account, and make allotments in full or larger allotments to others, and may establish a graduated scale of allotments to others, and may from time to time adopt any or all of said methods, should any such action be deemed by it to be in the public interest, provided that such reduction or increase or allotments of such bonds shall be made under general rules to be prescribed by said board, and shall apply to all subscribers similarly situated. Any portion of the bonds so offered and not taken may be otherwise disposed of by the board in such manner and at such price or prices as it may determine. The board may cancel any of the bonds so offered and not taken, and re-issue them in different denominations.

Bonds herein authorized shall be issued and sold only for the acquisition of such property and rights, and for the acquisition, construction, development, completion, operation and maintenance of such projects as the board may deem necessary or convenient for the accomplishment of the purposes of this Article; PROVIDED, that from time to time the board shall issue and sell bonds not exceeding in the aggregate 5 per centum of the assessed valuation of the state, the proceeds of which shall be placed in the Water and Power Revolving Fund in the State Treasury, which fund is hereby created to be used by the board for the purpose of defraying its expenses, acquiring property, rights, facilities, materials and supplies, carrying charges during construction, operation of facilities, and meeting other costs incurred in carrying out the purposes of the Article; PROVIDED, further, that if at any time the revenues from projects shall be insufficient to pay the interest upon and principal of outstanding bonds, as the same shall fall due, the board, in order to avoid appropriations from the general fund and resulting

taxation, may issue and sell bonds to provide funds required to make such payments of interest or principal. Except as otherwise provided in this Article, the board shall issue and sell bonds only upon the written report of the board, filed with its secretary, stating the amount of money required, the purpose for which it is to be used, and accompanied by a duly authorized certificate of the board, describing the property or rights to be acquired or the project proposed, and stating the estimated cost thereof, and showing the same to have been investigated and approved by the board, and in the case of a project, that plans and estimates therefor, a copy of which shall be annexed to such certificate, have been prepared and adopted by the board, and further certifying that in the opinion of the board, the revenue from the property or rights to be acquired or from the proposed project, together with the revenue available from other projects will be sufficient to pay within thirty years in addition to other necessary expenses, the principal and interest of the bonds to be issued.

#### Section 7

The board is hereby granted power to issue and sell interest bearing public utility certificates for the construction or acquisition by purchase, condemnation or otherwise, of any public utility authorized under this amendment. The certificate shall be secured by a mortgage or mortgages upon such public utility plant and the revenues derived therefrom, but shall not be a general obligation of the state and shall be paid solely from the plant or the sale thereof.

#### Section 8

The board shall establish such rates for service as in its judgment will provide, in addition to the expenses of operation, maintenance, depreciation, insurance and reserve for losses, funds to pay the principal and interest of all bonds issued under this Article, as the same may fall due, together with all sums which may be advanced from the general fund and interest thereon as herein provided.

Each project, as the same may be defined by the board, shall be charged by the board with its cost, which shall include its proper share as fixed by the board of all expenditures from the Water and Power Revolving Fund, and the shares so charged shall be credited to such revolving fund which shall be replenished, to the extent of the amount so credited, from the proceeds of bonds sold to provide funds for the cost of such project. The board shall establish such rates for the service furnished by each project as in its judgment will pay, within fifty years, such cost thereof, and the expenses of operation, maintenance, depreciation, interest, insurance and reserve for losses; provided, that where the rates are intended to provide for the repayment of expenditures made in acquiring or constructing distributing systems for political subdivisions, they shall be so fixed as in the judgment of the board will repay the amount of such expenditures with interest within thirty years. The board may change rates when in its opinion advisable to meet changed conditions, and shall always keep its rates as near the amount required to pay such costs and expenses as practicable, and shall fix similar rates under substantially similar conditions.

#### Section 9

All revenues of the board, including proceeds from the sale of bonds, shall be paid into the State Treasury and shall be applied first, to payment of the expenses of the board, cost of operation, maintenance, depreciation, insurance, and losses, and second, to the payment of interest on the principal of said bonds, and shall only be paid out as other moneys on vouchers or in the manner as other state moneys are paid out by the State Treasurer.

If at any time the moneys in the State Treasury applicable to the payment of interest or principal of said bonds, shall be insufficient to pay the same as it falls due, moneys shall be temporarily advanced from the general fund for that purpose, and there is hereby appropriated from the general fund in the State Treasury such sums annually as will be necessary to pay such interest and principal, and there shall be collected each year in the same manner and at the same time as other state revenue is collected, such sums in addition to the other revenue of the state as shall be required to pay the sums appropriated for payment of interest and principal as herein provided, and it is hereby made the duty of all officers charged by law with any duty with regard to the levy and collection of said revenue to do and perform each and every act which shall be necessary to collect such additional sum.

All moneys paid from the general fund in the State Treasury for principal of or interest on such bonds shall be returned into said general fund out of the revenue of the board as soon as the same become available, together with interest thereon from the several dates of such advances until so returned at the rate of six per cent per annum.

#### Section 10

Out of any money in the State Treasury not otherwise appropriated, the sum of two hundred fifty thousand dollars is hereby appropriated to be credited to the board and an equivalent amount shall be returned into the general fund in the State Treasury, out of the first moneys available in the Water and Power Revolving Fund.

#### Section 11

The board may establish such funds in the State Treasury as in its judgment may be required to carry out the purposes of this Article.

The board shall keep full and particular account and record of all their proceedings under this Article, and shall transmit to the Governor annually a report thereof, not less than one thousand copies of which shall be printed by the State Printer and shall be, by the Governor, laid before the Legislature, biennially, and all books and papers pertaining to the matters provided for in this Article shall at all times be opened during business hours to the inspection of any officer or citizen of the state. All accounts of receipts and disbursements shall be audited annually in the same manner that the accounts of the State Treasurer are audited.

#### Section 12

The state and political subdivision shall have a preferred right to water and electric energy controlled by the board as against privately owned public utilities selling water or electric energy to the public, and no contract or act of the board shall interfere with such preferred right.

The board shall not supply water to a privately owned public utility for the production of electric energy and shall not supply directly or indirectly to privately owned public utilities which sell electric energy or water to the public more than 20 per cent to the total amount of electric energy or water under its control and contracts therefor shall contain the rates to be charged the consumer and shall not extend over a longer period than five years, or to be renewed before one year prior to their expiration. Before making or renewing such a contract, the board shall publish a notice of its intention so to do, at least six days each week for a period of sixty days in at least one newspaper published and circulated in this state, and designated by order of the board for that purpose. Public utilities taking such contracts shall be required to provide the board with standby service at reasonable rates.

#### Section 13

Nothing contained in this Article shall prevent any political subdivision itself, or in co-operation with other political subdivisions, from developing any water or electric energy owned or controlled by it; but plans for any such development hereafter proposed shall be submitted to the board for suggestions and criticisms, so that the co-operation of the board may be secured, if practicable, for the fullest development of the proposed project. The board may acquire and develop any such project unless the political subdivision claiming the same shall have adopted plans and estimates for the development, and authorized bond to cover the cost thereof, or shall do so, within two years after the board shall have notified such political subdivision of its readiness to proceed with such development.

#### Section 14

In any proceeding in eminent domain brought by the board under the provisions hereof, the determination of the board that the taking of the property described in the complaint is necessary for the purposes hereof shall be conclusive evidence of such necessity.

In any such proceeding the state may take immediate possession and use of any property required for the purpose of this Article, by paying into court such amount of money as the court, upon five days' notice to the adverse party, may determine as reasonably adequate to secure to the owner of the property sought to be taken immediate payment of just compensation for such taking and any damages incident thereto.

#### Section 15

All public officers, boards, commissioners and agencies shall make available to the board all data and information in their possession required by the board, and shall render every assistance in their power in carrying out the provisions of this Article.

#### Section 16

The term "political subdivision" as used in this Article is hereby defined to mean and include any state, county, city, town, public board, public corporation or quasi public corporation, water district, irrigation district, municipal corporation, having authority to contract for the purchase, sale or use of water, water power, or electric energy, but shall not be construed to include any privately owned public utility.

# Rural Electrification from an Economic and Engineering Standpoint---II

## Extension Policies and Rate Derivation

By L. S. Wing\*

Engineer, California Farm Bureau Federation, San Francisco

A REVIEW of rural extension policies which have been in effect during the past shows that the ideas of the utility managements have been quite as individual and varied as in the case of rural rate schedules, and on the whole quite as unsatisfactory. Not until 1924 was there an extension policy in effect in California which was satisfactory to both the utility and the consumer.

The first extensions were built without any well defined rules. The company built into any territory which looked profitable. Soon, though, consumers beyond desired services and this was rendered if the consumer put up the entire amount of the cost of line construction. Money so advanced was sometimes refunded on the basis of 50 per cent to as low as 10 per cent of the bills for electricity used. Some rules provided refunds also for additional business at the rate of so many dollars for each kind of business added. Later the rules became more liberal and the companies agreed to spend twice the estimated annual revenue; the difference between this amount and the estimated, or final cost of the line, was to be advanced by the consumer. This rule was later still further liberalized to a ratio of three to one, and one large company now extends its lines spending five dollars in distribution lines, transformers, meters, etc., for each dollar of estimated revenue from the extension.

The advances made for lines under these old rules were usually refundable on two bases: First, for new business added which required no additional investment by the company except for service and meter, \$50 for each lighting range or water heater service, and \$10 for each horsepower of motor load. Second, 20 per cent of the monthly bills for service received.

Extensions were also made without any advance if the farmer would build a sufficient amount of the line to bring the balance within the free limits of the rule, or if he would guarantee an annual revenue over a three-year period equal to the cost of the extension. Practically all contracts were for three years initial service, and no refunds were made after the tenth year. These old extension contracts gave rise to many complaints of which the following are representative:

1. Consumers believed the company's estimates, or actual cost of building the line, were too high.
2. Consumers expected a refund as soon as new business came on to the line, but seldom received

it because additional construction was usually required.

3. Where consumer guaranteed more than his requirement under the three-year guarantee plan, he wasted energy and was dissatisfied because he paid for something he couldn't beneficially use.

4. In some cases lines were financed by selling stock of the utility to the prospective consumers; this practice led to considerable complaint and was abandoned several years ago.

Under the above mentioned rules the company was obliged to make quite detailed estimates of many extensions which were never built. If the extension were made, and it required an advance, the consumer often complained of the efficiency of the company's construction crews, and many cases were referred to the state commission for investigation and adjustment. The most dissatisfaction arose from those parties who financed a line where one of their neighbors refused to aid, who, when the line had been constructed, would apply for service and often get it free or with a much smaller advance than was made by the others. The parties to the original extension felt that they were entitled to be recouped in part for the advance made by them, and looked to the company for a refund. This under the rules prevalent was usually impossible.

In 1924 as a result of the combined efforts of the State Railroad Commission and the California Farm Bureau Federation, one utility put into effect a new type of extension rule. This type has met with so great success that most of the companies operating in rural territory have adopted it. It provides that the company shall furnish all transformers, services and meters, and construct in addition the following amounts of distribution lines free:

For each lighting consumer.....	100	feet
For each kw. of connected load of heating or cooking.....	75	"
For each refrigerator installation.....	100	"
For each hp. of power load (less than 5 hp.).....	75	"
For each hp. of power load (5 hp. or over).....	100	"
For extensions beyond the free length the consumer advances 25 cents per foot.		

A contract for an initial period of three years is required and refunds are made as follows up to the tenth year for ALL new business connected to the extensions:

For a new lighting consumer.....	\$25
For each kw. of additional cooking and heating load.....	6
For each additional hp. of power load.....	10

In addition to the above, 10 per cent of the consumer's power bills are refunded annually.

\* Extract from a paper before the annual convention of the American Society of Agricultural Engineers, Lake Tahoe, Calif., June 23-26, 1926. Part I appeared in the Sept. 1 issue of the Journal of Electricity.

This form of extension rule is equally popular with the utility and the consumer. It is simple and easily applied. The consumer can check the distances and, therefore, knows whether he is being fairly treated. Refunds are made for all new business which the extension has made possible; additional refunds based on consumer's bills encourage greater use. The companies like it because it has reduced extension complaints to a negligible quantity and also has done away with useless extension estimates.

An extension contract is presumed to represent a meeting of minds, a common understanding, and should be short and simply stated, for when couched in legal phraseology and filled with technical terms of which the farmer knows little or nothing, it is valueless. Usually then the farmer's understanding of the matter is entirely gained from the company's solicitor and is often wrong.

The chief requirements of an extension contract are:

1. It should be short, simple, and easily understood.

2. The company's investment should be based on factors readily understood by the consumer and within his control; namely, the amount of company's expenditure should depend upon the size and character of consumer's installation.

3. The guarantee to take service should not extend beyond a five-year period.

4. It should contain a statement that the rates charged are subject to change at the discretion of the regulatory body.

5. Refunds should be made on the basis of ALL business added to the line; also a certain per cent of consumer's bills should be refunded.

The rate for power, and the extension rule are closely allied, one being derived from the other, but in presenting them to the farmer they should be kept entirely separate. Every farmer should be on the same rate schedule regardless of any advance required by him to get service, or investment made by the company. He will likely forget any different amount advanced to get service than did his neighbor, but if made part of the rate, it is a perpetual reminder and he is apt to become dissatisfied.

The policy of utilities of selling utilization equipment to consumers is a good one; it is helpful in obtaining high load factor conditions from the start.

#### Allocation of Costs and Derivation of Rates

The law under which public utilities operate holds that they are entitled to a fair return upon the reasonable investment in properties used and useful in serving the public. This return is computed from the net revenue available after paying all operating expenses, taxes, and accrued depreciation. What constitutes a fair return cannot be definitely stated from court decisions. However, where an electric utility is developed and serving a dependable load, 8 per cent has come to be looked upon as

fair for small and moderate sized companies, and 7½ per cent return for the larger ones. During the years when it is necessary to pioneer the business as a whole or of a class, if a company earns sufficient net after operating expenses to pay the interest on the securities sold to finance the undertaking, it would be deemed extremely fortunate.

Depreciation is another subject concerning which there has been much discussion. Where rates are based on undepreciated values, the sinking fund method is generally used. In applying depreciation rates, it should be remembered that lives of equipment in rural districts are longer than in congested urban sections. In this state an allowance of 2 per cent for all rural equipment is ample. Maintenance of distribution lines exclusive of transformers, services and meters averages about \$50 per mile.

Rate making is not an exact science; it is an art. It involves determining the price which may be charged each class so that the total amount of service rendered will be the maximum and at the same time keep the utility financially sound. Accountants and rate experts have endeavored for years to devise some method upon which cost allocations to classes of service might be accurately predicated. All methods so far suggested fail to take into account the economic requirements of the classes served. It is true that such factors have nothing to do with the cost to the utility of serving them, yet it is equally true that rates must recognize the ability of the consumer to pay a certain maximum revenue or else he will not take the service.

#### Costs Incurred by Utility

Arbitrary cost allocations to classes are for the most part futile. The cost incurred by the utility is to a great extent that in connection with serving all classes. This cost must be viewed in its entirety and compared with the total revenue which can be obtained in serving the entire load. All attempts to break it down into component parts are based upon arbitrary combinations of facts. Under most methods of allocation the classes such as lighting must carry more than their ratable shares of fixed charges and general expense, while heating and such applications will not be able to pay much more than the bare additional cost of serving them. If no rate is below marginal cost and all classes are contributing something to the portion of the expenses which is not definitely assignable to any one class, in accordance with their ability to pay as measured by costs of substitutional forms of energy, then the rates are fair and equitable. The existing spread of rates has been based primarily on the above considerations with beneficial results to the communities served. An arbitrary spread of rates in accordance with theories so far advanced would often result in rate re-adjustment which, if made effective, would cause many companies to lose a great portion of their present business, which in turn would increase the existing rates to the very classes that, according to the theory of their proponents, are entitled to a reduction.



While the maximum peak of the year does not determine the company's total installed capacity, this investment, however, is not made for the loads served at the time of this peak alone, but for the entire business of the utility. Individual peaks also measure the cost of serving separately, by electricity, a class of consumers—but not the cost of substitutional service. Load factors of classes are helpful in determining the portion of the equipment used, but do not measure social needs.

The history of rates discloses the fact that every class of load and each consumer has not been equally profitable to the company. The company cannot economically charge more than the traffic will bear, and should not serve any class of consumers at less than marginal, or out-of-pocket cost. Between these two limits every rate should lie.

Because of the pioneering nature of rural electrification, rural consumers will not be able to pay more than the out-of-pocket costs of service for several years. There are, though, many instances where this load can be served without a loss to the utility or its other consumers, yet at rates which the farmer can afford to pay.

A study of the load curves of various utilities throughout the United States shows marked similarity in most of them. In general the annual peak of the system load occurs on a day in winter at about 5:30 p.m. This typical daily load curve for each season and for the annual peak is shown by Fig. 6, taken from a super-power survey made by the United States government in 1919.

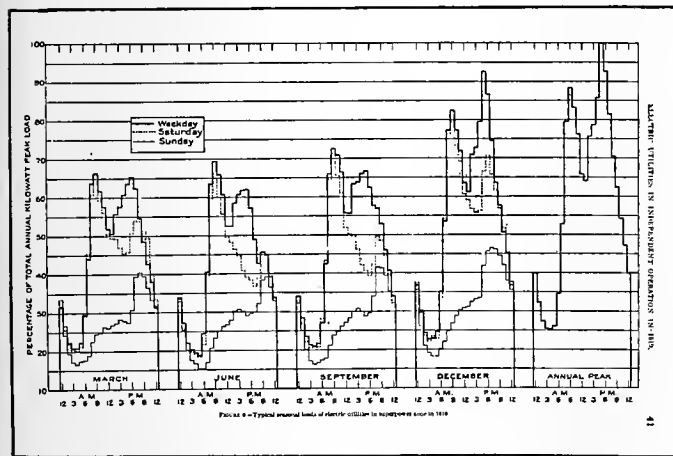


Fig. 6. Typical system seasonal and peak load curves.

In order to see what effect the agricultural load will have upon a utility's load curve it will be necessary to know the possible and probable use to which it will be applied on the farm which it serves. The domestic uses are quite well developed, and will be similar to those in urban communities, but greater use will be made on the farm of ranges, refrigerators and other such power consuming devices. An annual use at this time of 3,500 kw-hr. for domestic purposes can be beneficially made by many farmers. The farmer's chief labor and power applications occur between May and October, a load at present "off-peak" for the majority of utilities.

The amount of water which will be used in agriculture cannot be predicted, but the power load should be very desirable in that it will fill the summer valley in the annual load curve without additional investment in production and transmission equipment. This is illustrated by Fig. 2 in the preceding article. (Journal of Electricity, Sept. 1, p. 162.)

In designing a rate schedule, it is essential that each consumer pay the costs which he directly incurs due to the fact that he is connected to the power system, regardless of the amounts of energy which he uses. These are given in Group "A" in Fig. 7. Starting at the consumer's end of the system, the cost of rural service may be set up as follows:

#### Direct Costs Chargeable to Each Consumer

##### Group "A"—Entire amount charged against each consumer

1. Interest, depreciation, maintenance and operation expense on transformers, meters and service used in serving consumer.
2. Core losses in transformer, and meter shunt coil losses in equipment used to serve consumer.
3. Cost of meter reading, billing and collecting.
4. Portion of general expense and taxes applicable to above fixed charges and operating expenses.

##### Group "B" and "C"—Joint costs—in part chargeable directly and in part allocable to each consumer

1. Interest, depreciation and maintenance and operating expenses on distribution lines, substations and transmission lines.
2. Interest, depreciation and maintenance and operating expenses on distribution lines, substations and transmission lines. Allocated on some arbitrary basis.
3. Portion of general expense and taxes applicable to above fixed charges and operating expenses. Chargeable directly to consumer on kw-hr. basis.

##### Group "D"—Chargeable directly on a kw-hr. basis

1. Remaining costs of producing energy at generating point including transmission and distribution losses entailed in supplying consumer plus a portion of general expense and taxes.

Note: Interest should not be charged on property built with advance received from consumers.

Fig. 7 shows how these charges are incorporated in a rate schedule so that each consumer will pay the proper amount. The rate schedule if properly designed will collect from each consumer all of the charges under Group "A" and some portion of those under Group "B," even when the consumer's use is negligible. The total amount of the charges included in Group "B" and "C" which the consumer should pay will depend upon his total use, load factor and the class of service which he is taking.

All of the charges in Group "A" can be readily computed. The allocation of fixed charges and constant operating expenses, those costs which are incurred in providing and maintaining a plant capable of generating, transmitting and distributing electricity, are difficult to allocate to a particular class, or to different sizes of installations within the same class. In allocating distribution fixed costs chargeable against distribution lines, the diversity in each group of sizes into which the schedule is divided should be considered separately, viz: 1—4 hp.; 5—14 hp.; 15—49 hp., etc. The greater the diversity within a group, the less the fixed costs in Group

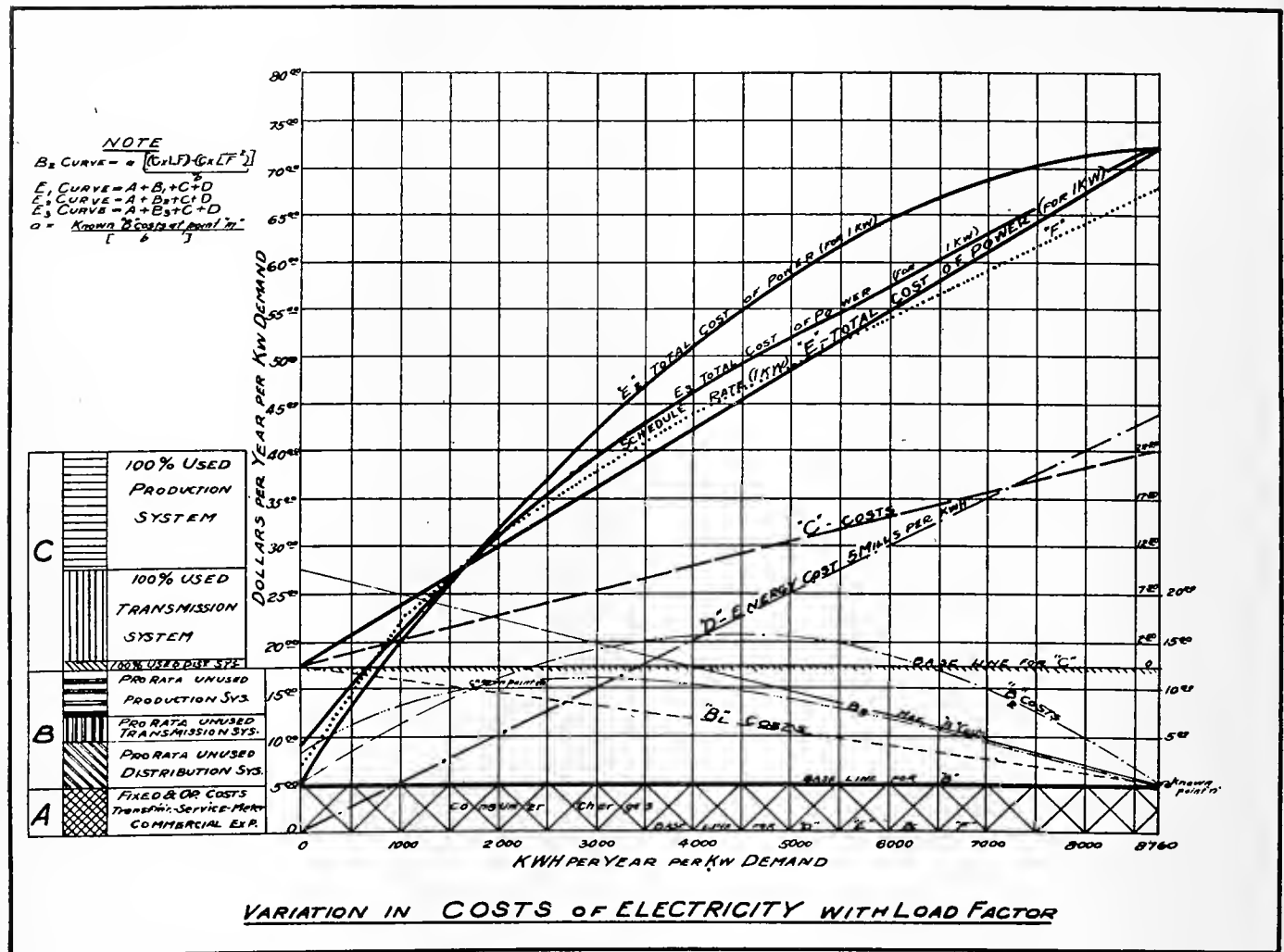


Fig. 7. Curves showing derivation of rural rate and proper allocation of costs.

"B" will be per unit of connected load or individual maximum demand. Although the maximum possible diversity within a group is the reciprocal of its load factor, in practice it will actually lie between unity (or no diversity) and this maximum. In practice it has also been proved that with two groups of loads of the same character having the same total connected load and load factor, the group having the greater number of installations will have the greater diversity. In other words, 20 5-hp. motors will have a smaller simultaneous demand than 10 10-hp. motors using the same amount of energy, for the same general purpose. Small motors, then, should not be charged as great a portion of distribution, transmission and production fixed costs in Group "B," per hp. of their individual maximum demands, as the larger sized motors in the same group. Offsetting this is the fact that large sized motors tend towards greater density per unit of distribution line length. This gain in density is not always real, for the large sized agricultural motors are usually installed in connection with large farms, and analysis has shown that the horsepower installed per acre is apt to be less for large motors than for the small sizes.

Reference to Fig. 7 will show that the costs of producing, transmitting and distributing energy have been segregated into three groups: "A," "B"

and "C," and "D" previously mentioned; Group "B" and "C" being subdivisions of the same group of costs. Group "A" charges are the costs incident to the consumer's individual installation and should be paid regardless of the amount of energy used, as they are independent of kilowatt-hours sold. They vary with the size of the installation but not in proportion to the connected load. Group "D" costs comprise the operating expenses which vary directly with the kilowatt-hours sold, such as fuel; these are indicated by the straight line "D." The remaining costs are fixed and are determined largely by the capacity of the plant; these are indicated by the groups "B" and "C."

Group "C" expenses are computed on the basis that the production, transmission and distribution systems are operated at 100 per cent load factor. This cost is derived by dividing the total costs chargeable to a class other than "A" and "D" expenses, for each part of the system involved by the maximum simultaneous demand at consumer's meters at the time of the system peak. This results in a cost per kilowatt for a 100 per cent load factor consumer; the amount chargeable against any particular consumer is then proportional to his load factor. These are indicated by the line "C."

Since the average load factor of any class is always less than 100 per cent, there will remain a

certain portion of these fixed costs (equal in per cent to one minus the weighted average load factor of the class) which will not be chargeable under "C." This portion of the production, transmission and distribution fixed expenses is termed the unused capacity costs and is indicated by Group "B." These remaining expenses are extremely difficult to allocate to installations operating at different load factors. In practice the actual costs per kilowatt are known for only the two points indicated on the "B" curves at "M" and "N." These two points are respectively at 100 per cent load factor and the weighted average load factor of the class. At 100 per cent load factor "B" costs or unused capacity costs become zero. At the weighted average load factor they are equal to the difference between the total fixed capacity costs and that portion of them which has been collected on the load factor basis "C," divided by the total individual demands of the class.

In order to determine the cost at other points one method would be to draw a straight line through these two points, such as " $B_1$ ". This yields a total cost of service corresponding to the straight line " $E_1$ ". This arbitrary "solution" of the problem in my opinion, is incorrect. The amount of the "B" charges per kilowatt of individual demand depends entirely upon the diversity of the load. Theoretically, diversity varies as the reciprocal of the load factor and would, therefore, be infinite at zero load factor, and unity at 100 per cent load factor, yielding a hyperbolic form of curve. The unused capacity costs vary as a straight line from a maximum at zero load factor to zero at 100 per cent load factor. These costs divided by the diversity at each corresponding load factor yield a curve similar to " $B_2$ ", but of lesser magnitude, the values having been increased in order to make the curve pass through the known point "M." The " $B_2$ " curve results in the total cost curve " $E_2$ ". This solution of the problem is also incorrect since it charges the high load factor consumer with excessively high capacity costs. Since the total capacity costs at any load factor should not exceed those at 100 per cent, another line " $B_3$ ", has been arbitrarily drawn which keeps below the maximum "B" line at all points, and yet has the same general trend as the " $B_2$ " curve. This line more nearly represents the "B" costs assessable at each load factor than does the straight line " $B_1$ ", since it takes into account the variation in diversity at different load factors. It gives a total cost curve " $E_3$ ". The application of this to commercial practice is illustrated by the schedule rate curve "F." The rate shown is blocked on the annual basis similar to the schedule shown in Fig. 4 in the preceding article.

Much has been said in regard to the charges which properly comprise a rural rate, but two things usually overlooked are the correct treatment of consumer's advances and the relationship which exists between the rate for service and the extension rule. The reason for the consumer making the advance is in order that rates may be maintained at the existing level, which is possible only if the same average investment in distribution lines is

maintained. Obviously, if the entire cost of the extra long extensions were included, it would defeat the very purpose of the advance and the consumers would be compelled to pay interest on the moneys they had loaned the utility. The other element often overlooked in making rural rates is the interdependency of the rate schedule and the extension rule. If the consumer paid for all rural distribution lines, transformers, meters, etc., he would be entitled to get power at the cost delivered from substation plus only line losses and the cost of maintaining the rural lines. On the other hand, if the company alone finances rural extensions, then the rate for energy delivered must be much higher. The average rate per kw-hr., therefore, depends upon the company's distribution investment per consumer, or per kilowatt of connected load, as well as upon other factors already mentioned. The amount of such distribution investment to be carried by the company will be arbitrarily determined but will depend upon the number of consumers per mile, the character of the load available, a consideration of the average consumer's ability to help finance the line, and the possible future development of business.

If the consumer's advance is large, then the rate will be comparatively low and future growth in business may not be sufficiently profitable to the company to warrant a refund of the advance; in other words, the cost of the new business taken on may equal the amount the company can afford to spend under the rates, leaving nothing available for refunds. This condition is unfair to the parties who have made the initial advance in that the company eventually owns the line and usually gets a return upon it although it has nothing invested.

The other extreme is for the company to finance the entire line. This may require a higher rate than that under which business will readily develop. It stifles heavy use, which is absolutely essential to rural line development. Some economic medium must, therefore, be taken between the two limits.

In connection with the extension rule, one more factor should be pointed out. After the company has determined the investment which it feels it should make on the average for each lighting, cooking, water heating, or refrigerator consumer, careful consideration should be given to the number of each of these installations which will be served from the lines, which will cost the company less than the average investment. The extension rule should provide terms liberal enough so that the installations served free which cost the company more than the average amount of the company's rural investment will be offset by those which are below the average. Rural villages should be considered as part of the rural load in determining rates and extension rules.

If this paper has shown to some extent that the factors which govern rural electrification are largely economic considerations, not susceptible of accurate mathematical analysis, and if it proves helpful in solving these problems, it will have served its purpose.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Use of "Grounding Banks" Protects Delta Circuits

### Auxiliary Bank of Transformers Gives Adequate Protection for Feeders Supplied From Delta Transformers

By L. F. HUNT, Development Engineer, Southern California Edison Company, Los Angeles

In substations where the 10- and 15-kv. circuits are fed from a delta transformer a grounding bank can be installed to furnish short-circuit current for tripping the circuits should they become grounded. This method of tripping of faulty feeders has been recommended for use in some substations on the Edison system. R. E. Cunningham of the Southern California Edison Company has added a very interesting and important feature to the above scheme.

In this method the grounding bank should be large enough to produce sufficient short-circuit current to blow fuses of the customers' transformers when grounds occur. Approximately nine-tenths of the trouble on circuit is caused by customers' faulty apparatus. Thus, if the fuses of the customers' faulty transformers blow the trouble

could be installed so as to open up the closed delta, this switch operated by an overload relay that has sufficient time element to allow for the clearance of any outside trouble. In this case methods must be used to pick out the feeder in trouble and then to drop it until the trouble is cleared up.

However, in the case of using a residual relay the circuit that has sustained trouble will be cut out automatically. Using the residual relay scheme of Roy Wilkins of the Pacific Gas and Electric Company, a scheme has been worked out as shown in Fig. 1. This scheme shows the use of a grounding bank and residual relays. The grounding bank also can be used for ground detection. If the secondary voltage of the grounding bank is above the 63.5 volts, which is normal for the ground detector, a potential trans-

The residual relay is made from a Westinghouse type CO low-energy overload relay. The change of connections is shown in the insert, Fig. 1. The three characteristic curves give the functioning of this residual relay. See Fig. 2.

Theories regarding the amount of short-circuit current available from a grounding bank disagree. Therefore, a set-up of an actual grounding bank was made and tests made to ascertain the proper theory. From these tests the short-circuit current in the line phase-wire going out to the trouble is determined as follows:

$$\frac{Kva. \times 100}{Ex \sqrt{3} \times \%Z}$$

Kva. = Total capacity of grounding bank.

E = Bus voltage.

%Z = Impedance of grounding bank plus impedance of line involved.

The current in the closed delta of the grounding bank will be  $\frac{1}{3}$  of the

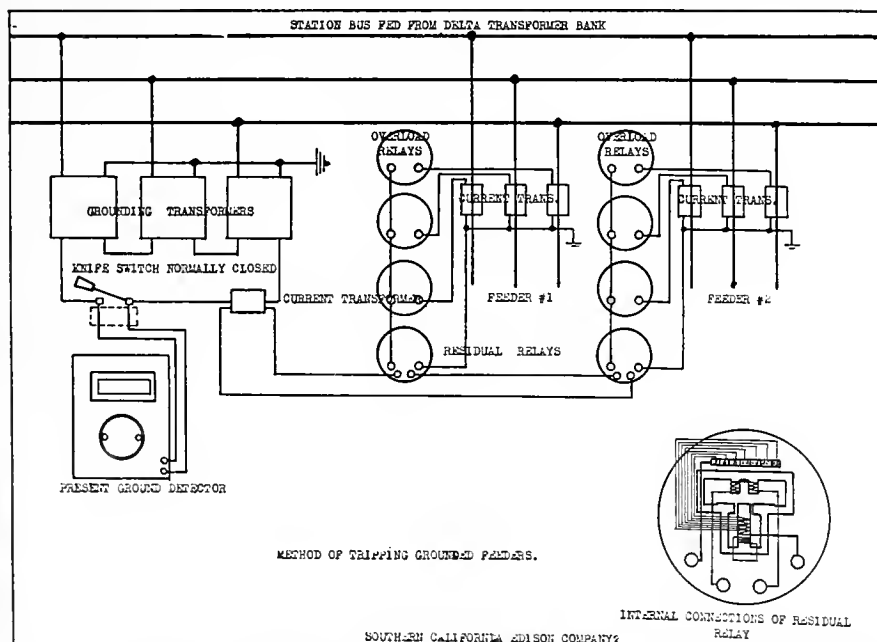


Fig. 1. Diagram of connections for "grounding bank" method of supplying trip current for delta feeders.

is isolated and does not involve the whole circuit. However, in the case a line happens to fall down and the grounding bank does not produce sufficient ground current to kick out the feeder switch from overload, a means must be provided to trip the switch cut from ground current or overload protection installed on the grounding transformer. An automatic switch

former may be used to reduce the potential to the desired value. The knife switch or oil switch is used to take readings on the ground detector. In cases of slight grounds a reading on the ground detector would indicate such conditions. The current transformer used in the closed delta would have its ratio in keeping with the current desired for the residual relay operation.

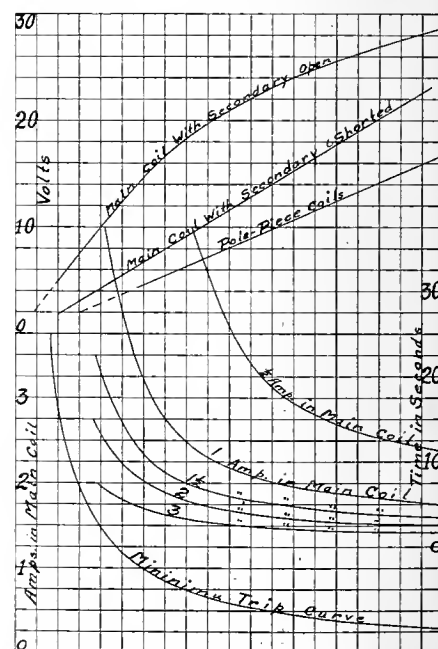


Fig. 2. Characteristic curves of residual relay.

above current times inverse ratio of the turn ratio of the transformers.

A diagram of schematic connections of the grounding transformer, station transformer and feeder is shown in Fig. 3. The short-circuit current magnitude and direction are indicated by the arrows for the assumed case of C-phase grounded. Transformer C is shorted due to the ground, but trans-



formers A and B still are energized, causing the effective voltage to be produced across transformer C. Thus this voltage produces short circuit current in C. The three transformers being closed delta give the equivalent of three transformers in series. Consequently transformers A and B have the same magnitude of current as in C. This current in the primary then is obtained from the station transformer bank in phase A and B. However, the three currents, due to being in the same phase relation, add up on the phase-wire of the feeder in trouble.

#### Typical Example

With the above information the size of grounding bank necessary for a given installation easily is calculated. It is desired to have a grounding transformer that will be capable of delivering sufficient short-circuit current to blow a customer's fuse at the end of the longest feeder on that particular bus. The customer's transformers generally are fused with from 5 to 25-amp. fuses. In order to have fuses blow, approximately 75 amp. should be produced by the grounding transformer. For example assume a circuit from Katella substation where the kva. necessary to produce 75 amp. at the end of the 11-kv. line will be as shown in the calculation below.

The approximate impedance of the 11-kv. line is about 0.755 ohm per mile. Assuming 10 miles as the longest line from Ketella:

$$I_s = \frac{\text{kva.} \times 100}{11 \text{ kv.} \sqrt{3} \%Z}$$

$$\%Z = \sqrt{\left( \frac{\%X_M + \text{kva.} \times X_H}{(\text{kv.})^2 \times 10} \right)^2 + \left( \frac{\%R_M + \text{kva.} \times R_H}{(\text{kv.})^2 \times 10} \right)^2} \text{ Exact}$$

$$\%Z = \%Z_M + \frac{\text{kva.} \times Z_H}{(\text{kv.})^2 \times 10}$$

approximate. Where  $Z_M$  of transformers to be used is approximately 4.0, therefore

$$\%Z = 4.0 + \frac{\text{kva.} \times 7.55}{121 \times 10} \text{ and therefore}$$

$$I_s = 75 = \frac{\text{kva.} \times 100}{11 \times \sqrt{3} \left( \frac{4.0 + \text{kva.} \times 7.75}{1,210} \right)}$$

$$75 = \frac{\text{kva.} \times 100}{11 \times \sqrt{3} \left( \frac{4840 + \text{kva.} \times 7.75}{1,210} \right)}$$

$$75 = \frac{\text{kva.} 121,000}{92,100 + 147 \text{ kva.}}$$

$$121,000 \text{ kva.} - 11,000 \text{ kva.} = 6,900,000$$

$$110,000 \text{ kva.} = 6,900,000$$

$$\text{kva.} = 62.5$$

TO CHECK:

$$I_s = \frac{62.5 \times 100}{11 \sqrt{3} \left( \frac{4 + 62.5 \times 7.75}{1,210} \right)}$$

$$= \frac{62.5 \times 100}{19. (4 + 0.4)}$$

$$= 74.8$$

Where:

$\%Z = \% \text{ Total impedance}$

$\%Z_M = \% \text{ Transformer impedance}$

$\%Z_H = \% \text{ Line impedance}$

$I_s = \text{Short-circuit current}$

$I_R = \text{Current in delta of grounding bank}$

According to the above calculations the size of transformers to be used should be three 25-kva. transformers.

If three 25-kva. transformers were used, plenty of current would be produced to blow fuses in cases of ground trouble.

$$I_s = \frac{75 \times 100}{11 \sqrt{3} \left( \frac{4 + 75 \times 7.75}{1,210} \right)}$$

$$= 88 \text{ amp.}$$

Assuming a ratio of 11,000 to 440 volts:

$$I_R = \frac{11,000 \times 88}{440 \times 3} = 734 \text{ amp.}$$

Using a current-transformer ratio of 200/5 to excite residual relays as shown in Fig. 3, 18.3 amp. will flow through the residual relay pole-piece windings.

The circuit current-transformer ratio is 200/5. Therefore, 88 amp. ground current would give 2.2 amp. through the other winding of the relay. From the minimum-trip curve (Fig. 3) of this relay, using 2.2 amp. in the main coil, it will require but 0.7 amp. in the pole-piece winding to trip and the cur-

rent available is 18.3 amp. This gives 26 times minimum-trip value. Therefore, grounds less severe than 100 per cent will produce sufficient current to operate the residual relay.

In the event that the residual relay is not desired an overload relay could be used across the current transformer connected in the delta of the grounding-transformer bank. Full-load current of the 25-kva. transformers on the low side is 57 amp. Therefore, the current transformer ratio would need to be 100/5 and the overload relay should be set on the 4-amp. tap with a long time setting. This relay should operate a switch that will open up the delta on the low side, relieving the bank of short-circuit current.

#### Operating Data on Creosoted Pine Poles

By H. E. BRAUNIG, Superintendent of Transmission and Distribution, Eastern Texas Electric Company, Beaumont, Texas

An increase in the use of creosoted pine poles throughout the entire country during the past several years has made possible a more thorough knowledge of these poles through studies accompanying this increase. The prime object of the following discussion is to present something of a summary of these recent studies. The sources of data will be found completely listed in the accompanying bibliography.

#### Strength

Strength is mentioned first because of its prime importance in line construction and because it is an outstanding characteristic of creosoted pine. That creosoted pine has a greater strength than other woods is borne out by the results of investigations carried on by the American Telephone & Telegraph Company, the United States Forest Products Laboratory, and the Department of Agriculture. In Bulletin 556 of the Department of Agriculture the creosoted pine is listed as being 44 per cent stronger than its nearest competitor, and this is confirmed by the others. In line construction it is possible to take advantage of this greater strength in either of two ways, smaller poles may be used or longer spans safely carried on the usual sizes of poles.

A fact of equal importance is that creosoted pine retains its strength over a long period of time. Tests, some of which have been made within the past two years, on creosoted pine poles 27 years old showed no decrease in pole strength. All evidence seems to show that as long as the wood is preserved against decay the original strength is undiminished.

A striking example of this occurred in the Beaumont, Texas, territory March 30, 1926, when a cyclone hit that vicinity and did extensive damage to all forms of structures except creosoted pine poles. On the properties of the Eastern Texas Electric Company there was much damage done, a great many wires and some 60-odd poles being broken. However, none of the creosoted poles were broken even though some of them were blown over to angles of as much as 40 deg., breaking conductors and insulators. Fig. 1 shows a section of the Beaumont-Liberty 66-kv. transmission line that was in the path of a 110-mile wind

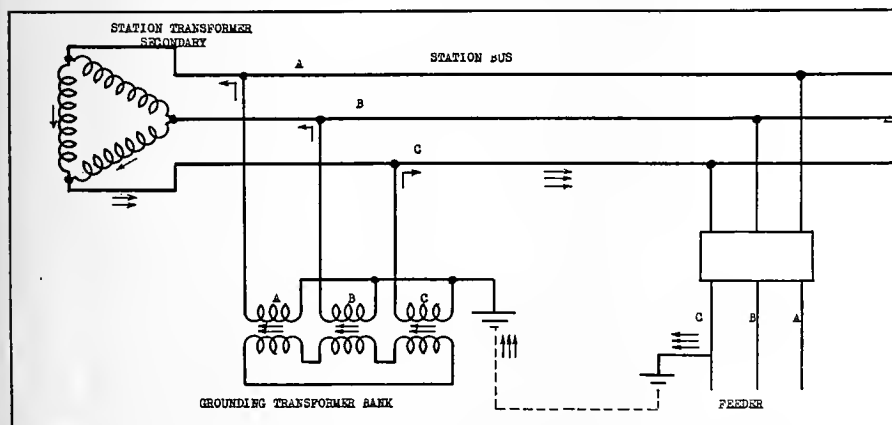


Fig. 3. Schematic diagram of connections for grounding transformer bank.

during this storm. This line is constructed on 55-ft. creosoted pine poles.



Fig. 1. Beaumont-Sour Lake 66-kv. transmission line is constructed of creosoted pine poles and successfully withstood 110-mile wind.

### Life

The life of creosoted pine poles has been estimated variously at from 25 to 40 years of active service. The tendency seems to be toward the higher figure. A power line between Port Arthur and Beaumont constructed on 652 creosoted pine poles in 1912 is still in service, having had only three poles replaced in 14 years. Even the poles replaced were solid at the ground line and at the top but were decayed where they had been abraded deeply. A telephone line between Dallas and Sherman, Tex., built in 1909, on some 2,400 creosoted pine poles never has had even a single replacement. Another telephone line constructed of this type of poles in 1898 has had less than 10 per cent replacements in the 28 years ensuing.

In examining these old lines it is outstandingly apparent that the poles are about as good as they ever were. The wood is preserved by the creosote and as long as the wood remains sound there seems to be no deterioration in strength or quality. It is of interest to note that these cases deal with poles treated from 15 to 30 years ago. The art of timber treatment has advanced during these years, and there is no doubt that present-day treatments are much more efficacious than the earlier treatments and methods.

### Conductivity

The conductivity of creosoted pine poles appears to be dependent upon the moisture content of the pole, the period of seasoning after treatment, and to the percentage of turpentine and rosin, if any, left in the poles when treated. It is interesting also to note that the dry, untreated pole shows about the same resistivity as does the treated pole directly after treatment. Thus it would seem to be of advantage that the poles be seasoned for a period of two months after treatment, or pass through some process producing a similar result. Consensus of opinion seems to be that creosoted poles are at least as satisfactory from a conductivity standpoint as any other pole.

### Birds and Insects

White ants are a serious problem on the Gulf Coast. They are one of the most virulent wood destroyers known and once they begin work upon a pole nothing can save it from total destruction. It is not uncommon for this insect to riddle completely an untreated pole within a year's time. Experience to date has shown that creosoted poles

are the only ones successful in withstanding the attacks of the Termite, or white ant, for a long period of time. This is due not to the wood itself but to the presence of creosote forced deep into the wood by the treatment process.

In this connection it is of interest to note that during the above-mentioned storm where several insect-damaged poles went down under the enormous wind pressure the damage was stopped where creosoted poles were encountered.

Woodpeckers are not numerous in many sections of the Southwest. In some places, however, they have done serious damage, weakening poles both by the removal of wood from the pole and by making pockets which hold moisture and hence promote decay. Creosote has been found to be highly resistant to these pests, too.

### Fire Resistance

Irrefutable authorities state that, while freshly treated timber is more readily inflammable than untreated timber, the older treated timber is much

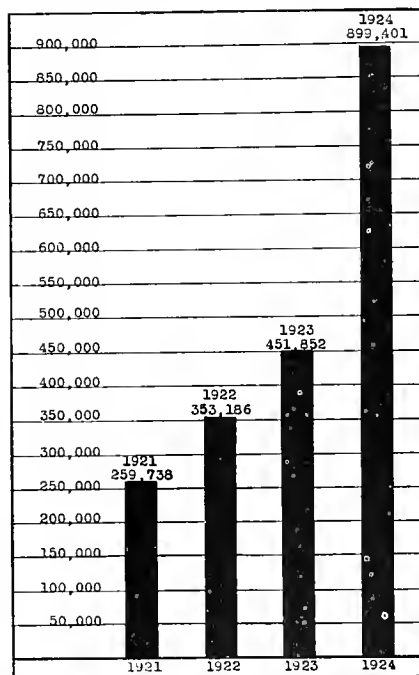


Fig. 2. Increasing use of creosoted yellow pine poles in the United States, based upon U.S. Forest Service statistics.

more fire-resistant than untreated timber. Experience and research point out that, as between treated and untreated wood, the former is less subject to fire damage. This fire-resisting quality of creosoted wood is explained upon the basis that when creosoted timber is ignited a chemical decomposition of the creosote takes place during the burning. This decomposition deposits a coating of carbon on the wood, protecting it to a certain extent.

### Costs

Definite cost figures depend upon the local conditions to which any particular utility may be subject, such as freight rates, installation and labor costs, climatic conditions, and other items, all of which will vary for different companies. However, studies made by the Eastern Texas Electric Company and by the Carolina Light & Power

Company show creosoted pine as having a decidedly lower annual cost than any other pole.

### Bibliography

1. Tests on Pole Strength. By American Telephone & Telegraph Company, 1924. (These reports are to be published by one of the engineering societies.)
2. Results of Some Strength Tests on Wood Poles. By T. R. C. Wilson, U. S. Forest Products Laboratory, Madison, Wis.
3. Southern Pine Poles. 1923 report of Overhead Systems Committee, Pennsylvania Electric Association, Eastern Geographic Division, N.E.L.A.
4. Characteristic and Cost Data. April 1, 1925. By Distribution Department, Carolina Light & Power Company.
5. Report of Inspection of Preservative Treatment, Dallas-Sherman Toll Pole Line, 1921. Southwestern Bell Telephone Company, Dallas, Texas.
6. Wood Preserving News, September, 1925.
7. Report of Conductivity Committee. In Proceedings of American Wood Preservers Association. 1923. Pages 362-3.
8. Tests of Methods of Protecting Woods Against Termites or White Ants. U. S. Department of Agriculture Bulletin No. 1231. By Thomas E. Snyder.
9. The Fire Hazard of Treated Timber. Proceedings of American Railway Bridge and Builders' Association. October, 1924. Pages 152-3.
10. The Creosoting Industry with Relation to the Fire Hazard. Quarterly of the National Fire Protection Association. April, 1918. Pages 399-413.
11. Quantity of Wood Treated and Preservative Used in the United States in 1923. IBID 1924. Published by R. K. Helphensstine, U. S. Forest Service, in co-operation with American Wood Preservers Association.
12. Report on the Stability of Concrete Poles for Use by Light, Power and Street Railway Companies. By C. V. Merriam, Eastern Texas Electric Company, Beaumont, Texas.

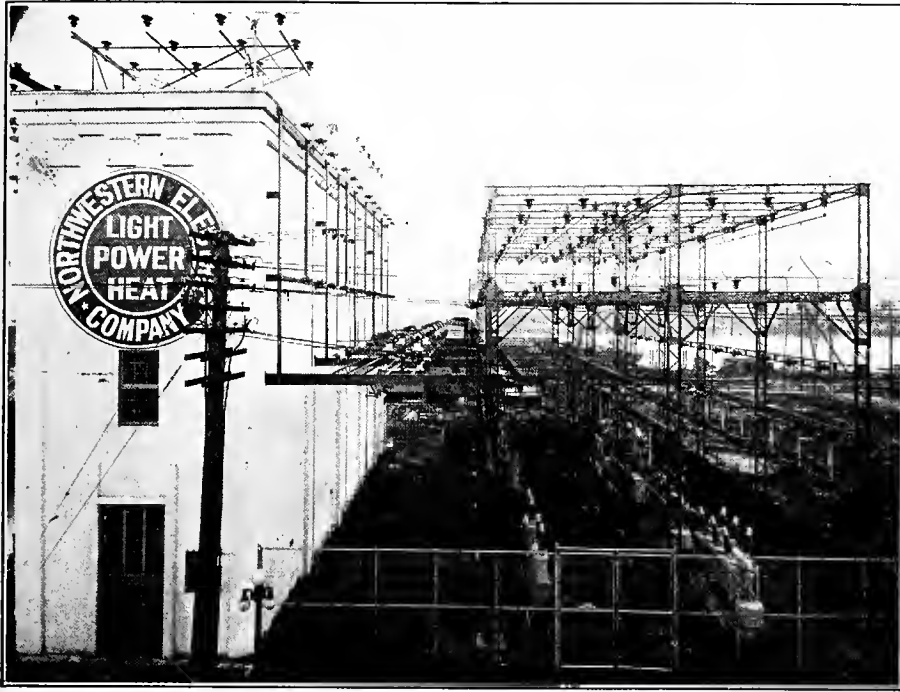
### New Transmission Switching Center Established

By E. F. PEARSON, Electrical Engineer, Northwestern Electric Company, Portland.

The new high-tension steel bus structure at the Albina substation of the Northwestern Electric Company, Portland, was installed to concentrate the control of the power sources of the company in the interest of greater flexibility. Three 66-kv. lines now converge at this station—the 70-mile transmission line from the Condit hydro plant on the White Salmon River, the tie line to the company's Lincoln Street steam plant in Portland, and the tie line to the Knott Street substation of the Portland Electric Power Company to effect a connection with the system of that company. Each of these lines has a capacity of 30,000 kw. A double bus and a single set of oil circuit breakers provide the necessary flexibility of switching.

A fourth position on the structure is occupied by a 66-kv. lead into the substation building to serve a step-down bank of transformers, of 12,000-kw. capacity, serving the 11-kv. distribution lines radiating from this station.

Main and auxiliary buses and all runs and leads are of copper tubing carried on O-B 73-kv. pin-type bus supports. The four high-tension positions are controlled through one G.E. and three Westinghouse oil circuit breakers of high interrupting capacity. These are remote-controlled from the switchboard inside the substation building. The breakers have a rating



View of newly rebuilt Albina substation of Northwestern Electric Company.

of 400 amp. at 73 kv., and an interrupting capacity of approximately 4,200 amp. at 66 kv. Lightning protection is afforded by a 73-kv. Westinghouse auto-valve type lightning arrester connected to the bus. Fourteen 600-amp., 73-kv., 3-pole, gang-operated, Bowie switches are installed for disconnect and bus-tie purposes.

The incoming 66-kv. circuits are metered through two G.E. and four Westinghouse oil-cooled, outdoor-type potential transformers and six Niagara air-insulated current transformers rated 300-600/5 amp. The latter are mounted on the steel framework near the building. The circuit feeding the substation is metered in the building on the 11-kv. side.

This switching station was put into service in December, 1925, and permits a more centralized control of the company's transmission system. Through it the main sources of the company's power supply can be tied together or isolated and, in emergencies, power can be delivered to or received from the Portland Electric Power Company.

### Fuse Renewals Facilitated by Handy Storage Rack

The disposition of spare high-potential fuses around many a substation is a troublesome item. Fuses for 11,000-volt service and especially those for 60,000-volt service are awkward things to take care of. They are stored frequently upon shelves in the store room or stacked on end in some corner, and in either case are subject to breakage and are not quickly accessible when occasion for their use arrives unexpectedly.

At Newark substation of the Pacific Gas and Electric Company the neat arrangement shown in the accompanying illustration has been rigged up by the operating force. The racks are made from such lumber as was available at the station and are bolted to the wall of the 11,000-volt bus-room. In this

location they are readily accessible from the operating room, the condenser room or the outdoor 60,000-volt potential transformer installations.

The fuses which appear in the foreground are 3-ampere 100,000-volt units, part of which are fitted with clips ready for installation on a moment's notice. Next is the rack carrying the 11,000-volt cartridges, and the third rack carries 2,300-volt bank fuses at the top, telephone fuses at the center and heavier station bank fuses at the bottom. The 60,000-volt units are in the rack which is mounted between the post and the doorway. Each different grade is labeled plainly with stenciled signs.

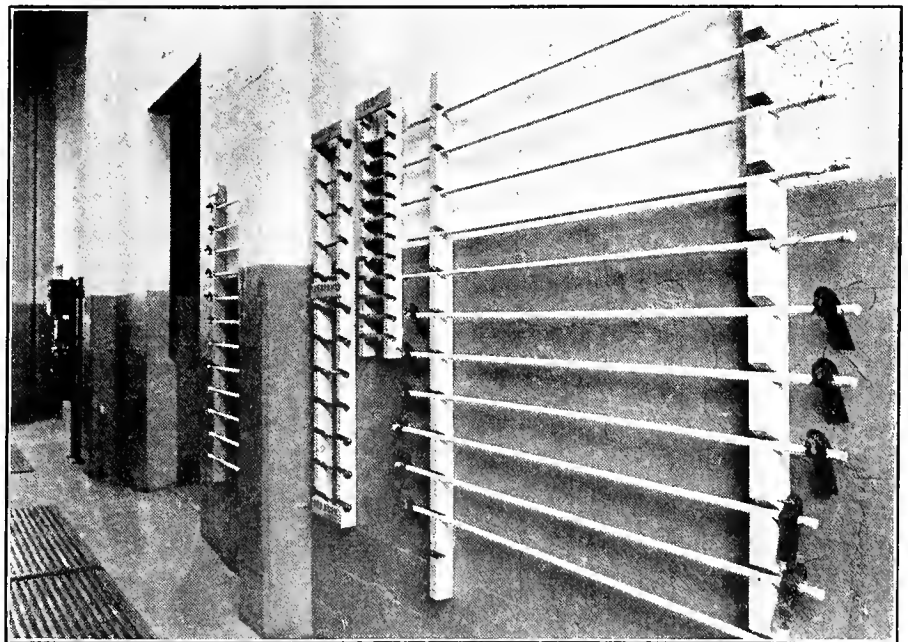
The racks are inexpensive, provide

adequate storage space for spare fuses, place spare units where they are readily accessible though out of danger of breakage, and actually improve the neat appearance of the room.

Marble dust has replaced asbestos fiber for the glass-tube packing for the higher potential fuses. It has been found that marble dust does not absorb any moisture, can be readily poured into the tube, as readily extracted from the tube, and prevents a large portion of unnecessary fuse failures. Ends are sealed with plaster-of-paris. This seal is broken easily when it is desired to break it, but of sufficient strength to withstand securely all normal usage and service conditions, including severe weathering.

Vinegar gives quick relief from boiler-compound burns. As is widely known, boiler compounds are highly caustic alkalis from which painful burns may be received if the compound comes into contact with the body. In and around plants where boilers are used constantly the use of boiler compounds is comparatively common, and consequently the possibilities of burns from accidents in handling are many. A glass-stoppered bottle of ammonia in a handy place will serve as an efficient first-aid station. In fact, several bottles placed in convenient locations and with suitable protecting holders would be a good investment around the steam-plant boiler room.

**New Relays.**—Relays similar in appearance and general operating characteristics to the well-known induction type have been developed for application to d.c. systems, according to the Westinghouse Electric & Manufacturing Company. These new relays operate on the magnetic-vane principle and are superior to previous d.c. relays in that they are more accurate and that they may be adjusted for different values of operating current, voltage and time.



A neat arrangement for storing spare potential fuses where they will be at once readily accessible and safe from damage.

# IDEAS FOR THE CONTRACTOR

## Medico-Dental Building Designed for Continuity Every Precaution Taken with Electrical Apparatus to Guarantee Uninterrupted Essential Services

By T. B. HUNTER, of Hunter and Hudson, Consulting Engineers

Nowhere is continuity of service more important, perhaps, than in a building devoted to the treatment of human ailments, the performance of the delicate operations upon which the health of human beings depends. Next to a hospital a building designed solely for physicians and dentists is to be classed in such a group. It must be provided with such installations of machinery as will guarantee uninterrupted service of the requisites to modern surgery, pure water supply, electricity supply, and compressed air supply. These must not fail since the moment of their failure conceivably might be the crucial moment in a delicate operation in which they might play an all important part.

The Medico-Dental Building, located at Post and Mason Streets, San Francisco, demanded just this type of mechanical service, a service uninterrupted by any of the accidents of fate, flood or fire. The building was being designed as the model for all such buildings, and therefore, in considering the electrical and mechanical installations, the demand was simple but unmistakable. There must be no failure of any of the essential services of water, electricity or air.

### Drinking Water System

Possibly the most important of the three is water. Therefore elaborate preparations were made in the new Medico-Dental Building for water supply and purification. Located in the attic of the building, the water tanks for drinking water, as well as for fire protection, have been housed. The drinking water is cooled by means of a Vulcan ammonia compressor and equipment. This system supplies chilled and purified water to all parts of the build-

ing. Spring Valley water is used but provision has been made for well water from the building's own wells in case of failure of the regular city supply. A tank in the basement is provided



The Medico-Dental Building, recently opened in San Francisco. Every means to make the essential services to the tenants of this building interruption-proof has been taken.

for well water should occasion to use it require.

The drinking water is run through a filter and then sterilized with ozone to kill all of the bacteria it might contain. The water is chilled to 40 to 45 deg. F., and circulated by means of pumps throughout the building. The overflow is returned to the tanks and rechilled.

Water to the two top stories of the building is supplied from an auxiliary pressure system, the head from the tanks in the attic not being considered sufficient. The intake for this auxiliary system is from the tanks supplying the remainder of the building. Two electrically driven pumps operating a

closed pressure tank system with air cushion, supply these two stories with water.

Three pumps in the basement supply water to the tanks in the attic for the water supply systems. These pumps are run by three 15-hp. Robbins and Myers, 220-volt, 3-phase, 1,750-r.p.m. motors. E.C. & M. auto compensators are employed in connection. The motors are controlled by means of automatic float switches located in the tanks. Three are used, and each is cross-connected so that no trouble will be experienced. One is used as a standby to insure operation.

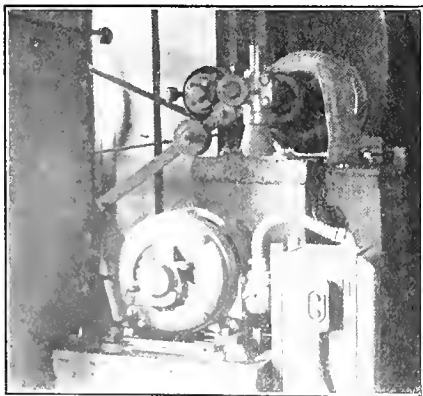
A panel board has been developed by us to provide a high and low water alarm in connection with the tanks in the attic. Located in the basement engine room, the panel has on it an 8-in. gong and a red lamp and a 6-in. gong and a green light, both operated from the float switches in the tanks in the attic, the red being to warn of high water and the green of low water. These are signals to provide the engineer with a warning in case the float switches fail to operate the motors running the pumps. The gong gives warning, and the colored lamp indicates whether the motors should be shut down or started. General Electric switches are used on this board, with Auto-call gongs.

### Fire Protection System

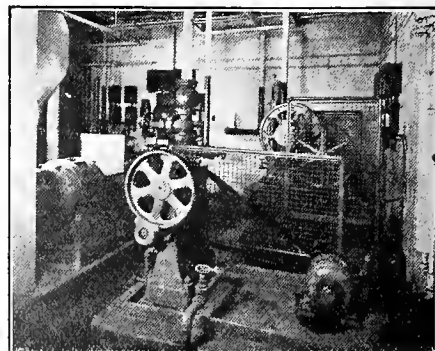
Beside the drinking water supply, a fire supply is provided, having separate tanks in the attic. The fire pump is automatically controlled by an E.C. & M. automatic compensator. A 100-hp. Robbins and Myers motor, 1,750 r.p.m. drives a 500-gal. per min. Hill centrifugal fire pump at 200-lb. pressure. A small auxiliary fire pump maintains pressure in the lines at all times and takes care of small leaks for which the main pump would not start operating.

### Electrical Equipment Complete

Not only is the electrical equipment of the building designed for present day high standards, but provision has

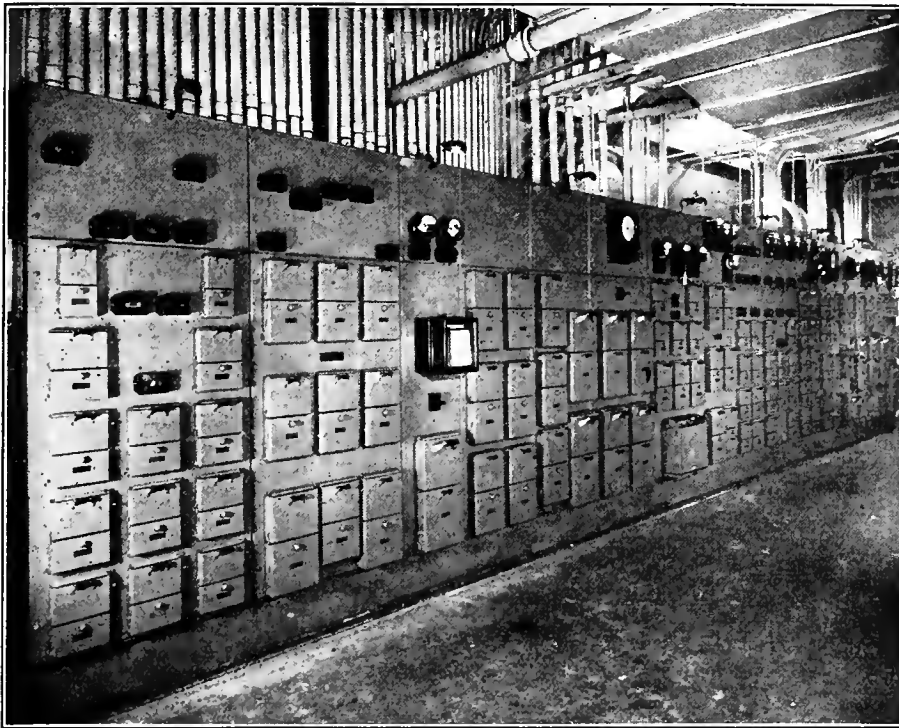


Motors mounted on cork to eliminate the transfer of vibration in the ventilators.



The auxiliary motor driving the pump which maintains the pressure in the standpipe.





"A beautiful installation" is the main switchboard. The workmanlike manner in which the conduits leading from the board are installed should be noted. X-Ray apparatus is controlled by the left end of the board, lighting the center, and power the right end of the board.

been made for increased use of electricity in the future. The main switchboard is 36 ft. 6 in. overall, and has provision for separate control of X-Ray apparatus, lighting and power.

The X-Ray equipment is supplied from a separate bank of transformers leading to a separate section of the main board. A separate service from the main switchboard is run to the X-Ray equipment in each individual doctor's office requiring it. This eliminates every possibility of interrupting service to all such apparatus caused by trouble on any individual set.

Every floor is supplied with two lines of 2-in. conduit, at present empty, running from the switchboard to the corridor ceiling. This conduit completely encircles each corridor. Ceiling outlet boxes have been provided at convenient locations so that additional service may be provided as the need may arise with the necessity for only a small hole being made in the corridor ceiling to provide it.

Another line of 1½-in. conduit is run to various parts of the building so that the direct current system may be extended.

One electric riser shaft in the building provides room for all circuits leading up from the main switchboard. Provision is made for an additional riser shaft in case another wing is added to the building later.

#### Elaborate Call System

An elaborate call system is installed throughout the building and is adapted to the particular needs of each physician or dentist. All of this system is installed with bridal wire and when two or three pair are required, lead covered cable is used. In all particulars every effort has been made to make such equipment as near trouble-proof as possible.

Transformers of 1,500-watts, 110-volt to 24-volt, to operate the system are located on alternate floors. A push

button layout is provided in every suite of sufficient elaborateness to require it. All buzzers are installed in outlet boxes covered with brass plates so as to be concealed. The push button circuits are also concealed. Tone changes are secured in the buzzers, which are all of the same type, to eliminate confusion and multiplicity, by mounting them on materials of various kinds, including wood, felt, brass, etc. Couch annunciators are used where elaborate call systems are necessary, and are set flush with the walls.

Phone circuits are also concealed, being led to the wiremold and concealed in 1-in. conduit drops. The 1-in. conduit allows sufficient room to care for any type of service required.

An intercommunicating phone system has been installed by Broemmels Pharmacy on the second floor to 36 or 40 offices in the building to provide direct service for prescriptions to physicians desiring them. Circuits for this system have been run in lead covered cable and made in every respect a first class job.

#### Much Special Equipment

Several offices are equipped with electric refrigerators to care for vaccine and serum containers. A great deal of special medical equipment has been installed, too, in many doctors' offices. Special provision has been made also for each kind of dental unit, of which there are a large number of types, many quite elaborate.

Compressed air is distributed throughout the building. It is provided from compressors in the basement and piped to each office. To eliminate every possibility of moisture or oil in the compressed air service, however, the air, after compression, is run through two Crane steam separators, then through an aftercooler. The latter device, cooled by water or brine, chills the air and precipitates any residual moisture or oil.

Ventilation has been given extraordinary attention. Located in the attic, near the water tanks, are two large exhaust fans. One exhausts the air from the laboratories and the inside dressing rooms, while the other exhausts the air from the inside toilet rooms. A 7½-hp., 870-r.p.m. and a 2-hp., 870-r.p.m. motor, both driving Sturtevant blowers, accomplish this work.

To prevent the vibration which would interfere with the physicians' sensitive



Automatic compensators controlling the motors which drive the house pumps supplying water to the tanks in the attic, may be seen in this photograph. The sump motors may be seen at the right, together with switches and control apparatus. The signal lights and gongs may be seen just above and to the left of this equipment.

stethoscopes, these motors have been mounted on wood and cork.

#### Heating, Vacuum and Sewage

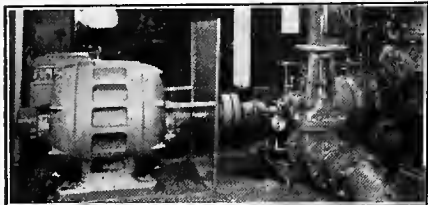
Heating of the building is accomplished by steam heat. W. S. Ray oil burners, electrically driven, are installed on the boilers. A motor driven oil pump supplies oil for all burners and the incinerator. A Nash electrically driven vacuum pump supplies the steam return on the heating system.

An electrically driven central vacuum sweeper system has been installed throughout the building. A line from this system has been run to the garage to be used for cleaning the upholstery in closed cars. A remote con-

trol switch from the garage sets the vacuum cleaner equipment in operation in the instance that it is not operating, such as on Sundays or after hours. A pilot light in the garage indicates whether or not the vacuum equipment is operating so that garage men may know whether or not to turn it on for their uses.

An air compressor is also a part of the garage equipment. There is also a fan to supply fresh air to the boiler room. A sewage pump to take care of basement waste is provided, since the basement is located below the street sewer level.

The Medico-Dental Building is unique in many respects, not the least of which is that every tenant is a stockholder in the corporation which owns it. It was designed by George W. Kelam, architect, with William G. Marchant, associated. The Turner Company, mechanical and electrical contractors, were responsible for the mechanical and electrical installations, while the Drendell Electrical & Manufacturing Company provided the switchboard. Hunter and Hudson were the consulting electrical engineers.



For the fire pump, this sturdy motor is used direct-connected.

## Contractor Installs Underground System for Tract

### Manholes Designed for Underground Installation at Santa Barbara Tract Accepted as Standard

An underground system to serve a large realty tract in Santa Barbara, known as Samarkand Hills, was installed in its entirety by the Nielson-Smith Electric Company, Electricists of Santa Barbara, and not only was the installation wholly acceptable to the power company and the telephone company serving in that territory, but the manholes designed and installed on the project were considered good enough to adopt as standard for all future installations of the same kind by these companies.

The Samarkand tract is a large new subdivision recently put on the market

in Santa Barbara. It is a highly restricted subdivision, containing 213 lots, and spreading over several blocks. (Fig. 1.) It was desired by the company handling the tract to provide adequate underground services of both electricity and telephone so that the tract might be entirely free of overhead poles of any kind. The First National Bank of Santa Barbara, as trustees for the Hollister estate, is financing the project.

In order to meet the approval of the Southern California Edison Company and the Santa Barbara Telephone Company, O. H. O'Neill, consulting en-

gineer, carefully laid out the complete installation. The work of installing the entire underground system, however, was done under the personal supervision of W. C. Nielson, of the Nielson-Smith Electric Company. The complete job, including the trenching, concrete work, conduit work and finishing was accomplished in 45 working days.

To serve the 213 lots in the tract the system was laid out so that two large primary manholes and 50 smaller manholes containing secondary vaults would care for the tract. As will be seen in the accompanying drawings separate manholes were provided for the power company and the telephone company. Each company is to maintain its own vault.

The large power vault was built 6 x 8 ft. and 7 ft. deep. The telephone vault adjoining it was smaller, being 4 x 5 ft. and 5 ft. in depth. For the smaller distribution manholes, the power company vault was reduced to 4 x 4 ft. and 5 ft. in depth. The telephone vaults were kept the same size throughout. Each was fitted with a drainage sump and was constructed with proper reinforcing according to its particular requirements. Standard telephone company and Edison company manhole castings and covers were used in their construction.

The primary system was laid in 3-in. Benico fiber duct, centered in a 9-in. concrete raceway, three inches of concrete being the minimum requirement on each side of the duct. Conduit laterals to the property line were run on top of this concrete raceway. For the power circuits, 1½-in. conduit is used, and for the telephone lines, ¾-in. conduit. Conduits for both telephone and power were run to the property line of each lot in the tract. Lead covered services will be pulled to each lot from the manhole nearest it as service is needed.

For the entire job 16,500 ft. of 3-in. Benico duct was used, serving the primary system. A primary voltage of 2,400 volts has been run to each

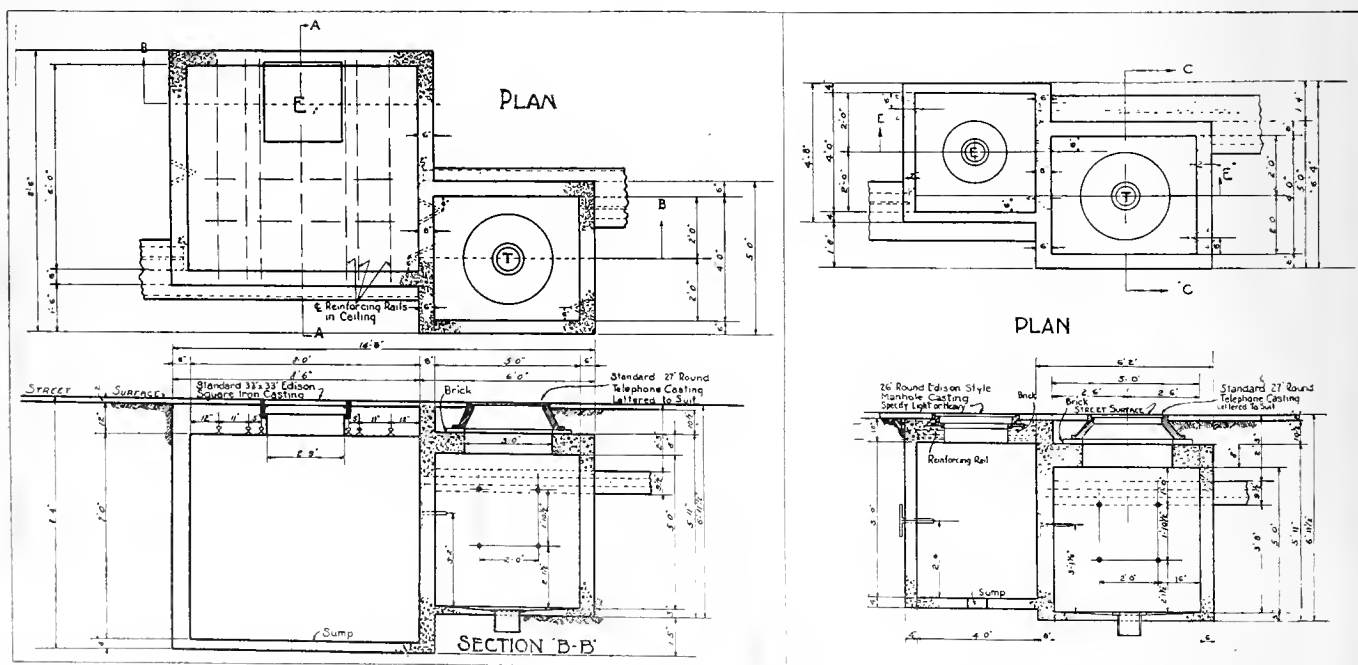


Fig. 2. Plans of the manholes used in connection with the Samarkand Hills underground system. At left the primary manholes, at right those for secondary distribution. The telephone manholes are shown adjoining, marked "T."

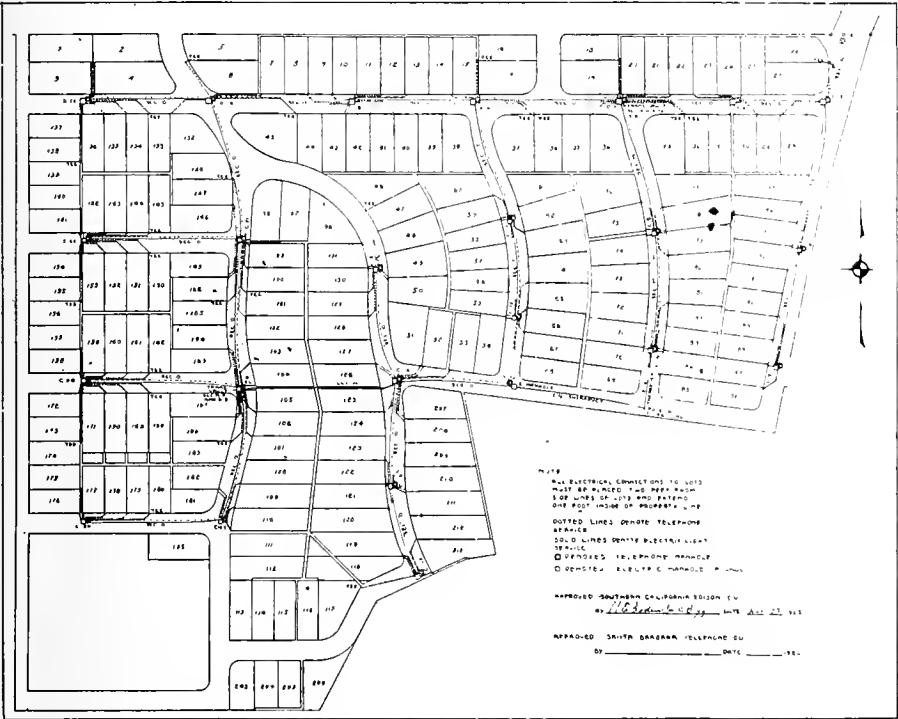


Fig. 1. Thact map of the Samarkand Hills subdivision in Santa Barbara, showing the layout of hanholes and conduits to serve each lot with electric and telephone service through an extensive underground system.

vault. For the service to each lot, 15,000 ft. of 1½-in. conduit was used. This will be of sufficient size to care for either 110 or 220-volt service to the residences to be erected on the tract. For the telephone system, 15,000 ft. of ¾-in. conduit was used.

Strip Lighting Inexpensive Yet Effective Lighting Method

A comparatively inexpensive and yet novel and effective way of attracting attention to some particular building for advertising its presence to the surrounding territory, is to light strips or sections of that building in colors at night. Ordinarily when night illumination is proposed the first thought is always of floodlighting, and while this is the most effective method, yet in many cases the singling out of some certain feature of a building for color lighting is very effective. Moreover, it may be accomplished within the available budget which many business firms, that would not floodlight completely, can provide for similar means of illumination.

Strip lighting has an added advantage in that it is installed on the building itself, requiring no easements or negotiations for flooding from some distance on other building or property. It is something which almost any contractor can feel he is equipped to produce, and which is adaptable to the small town as well as to the large city.

One of the better known examples of this type of lighting is that of Miller's Lafayette Cafe in Los Angeles, illustrated here. The photograph of the cafe and the diagram illustrate both the effect produced and the simplicity of the installation.

At the foot of each column between windows, an X-Ray projector has been mounted. The projector was equipped with a concentrating reflector. With a natural colored cover glass it is possible to project and control a narrow

beam of colored light upon each column. By using different colored cover glass in each of the units a striking effect is produced. The columns of

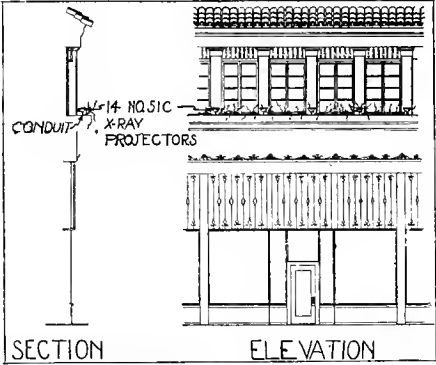


Diagram showing the method of placing lighting units to obtain strip lighting effects on a building. The units are shown concealed in plants at the second floor line of the building.



Strip lighting in colors as applied upon a cafe in Los Angeles. The columns are lighted each in a different color. The roof sign is not a part of the strip lighting layout.

the building shown in the illustration are lighted in red, yellow, green and blue, and have been alternated and changed on different occasions.

In this installation the No. 51 type of Curtis Lighting, Inc., projector is employed. Each unit used in this class of work is equipped with a 250-watt G-30 floodlighting lamp. The projectors are fastened to the wall and may be adjusted easily to control the rays of light. Outlets may be provided in a number of ways as shown in the diagram. In this instance a row of plants is used to screen the units from view.

Question Box

Arrangements have been made to answer through the columns of the Journal of Electricity such questions on electrical construction and other subjects as are of general interest. Inquiries should be sent to the Editor, Journal of Electricity, 883 Mission Street, San Francisco.

Q. 2. What is the "Navy Specification" for length of conduit nipples?—S.M.D.

I.P.S.	Lengths	
	Short	Long
In.	In.	In.
¾	1½	2½
1	1½	3½
1¼	2	3½
1½	2	4
2	2½	4½
	2½	4½

Q. 5. What is the melting point of pure copper? Pure gold? Pure platinum?—T.L.J.

A. Pure copper, 2,550 deg. F. Pure gold, 2,016 deg. F. Pure platinum, 4,100 deg. F.

Q. 4. What current is required to fuse the following size and type of wires?

No. 10 copper, No. 14 German silver, No. 22 iron, all B&S gage.—G. McM.

A. No. 10 B&S copper=333 amp.  
No. 14 B&S German silver=85 amp.  
No. 22 B&S iron=12 amp.





4. Includes installation of latest Delta Storelites.

5. Skilled workmen and careful supervision.

6. Genuine Mazda lamps.

The response to this advertising was exceedingly gratifying. No coupon was used, those interested being advised to phone or call at the local office. A great many merchants, however, merely clipped the ads from the papers, appended their names and mailed them to the company to signify that they welcomed further light on the matter.

Sales forces were concentrated on the campaign and every available man was utilized. In Denver the domestic sales group was enlisted in the drive and turned in one of the best score sheets on the system.

Singularly enough, the mining city of Leadville, isolated almost at the summit of the Continental Divide, led in percentage performance. With a quota of 75 units, William Wrenton and his corps there installed 359 units, which constituted 478.7 per cent of their allotted number. The following totals show the results elsewhere over the system, the listings being by sales groups:

	Placed	Quota	Per-centage
Denver domestic .....	2,631	1,158	237
Colorado Power.....	585	295	198.3
Salida .....	90	60	150

## Mountain Utilities Successful with Portable Lamps

### Colorado Company Sells 25 Lamps in an Hour; Utah Company Gives Convenience Outlet with Each Lamp Sold

Two mountain companies, merchandising portable lamps actively for some years, recently used novel sales means to promote the disposal of a large number of lamps, each of which should prove useful to the lamp merchandiser anywhere. The first, the Public Service Company of Colorado, in reducing its stock, used the diminishing discount sale with good effect. The other, the Utah Power & Light Company, adopted the plan of giving with each lamp a convenience outlet, thereby removing the greatest sales obstacle to the sale of lamps or other electrical appliances.

#### The Diminishing Discount Sale

The Public Service Company of Colorado sold 25 portable lamps in one hour at Boulder, Colo., not long ago in a novel sale intended for stock reducing rather than profit. Having overbought on lamps of this type, the local manager, Frank S. Henderson, decided to give the public some real values and at the same time promote a sale with institutional advertising features. It was late in the season and something out of the ordinary had to be evolved.

The medium selected was a diminishing discount sale. From 8 to 9 o'clock a discount of 30 per cent from regular prices was offered; from 9 to 10 a 25 per cent discount; from 10 to 11 a 20 per cent discount; from 11 to 12 a 15 per cent discount; and a 10 per cent discount throughout the remainder of the day.

All portable lamps in stock were offered. Usual terms of payment of 25 cents down and the balance monthly with the customer's light bill prevailed. The sale was announced once only through 3-column, 11-in. ads in each

Idaho Springs.....	36	25	144
Denver total .....	3,320	2,618	125.7
Lafayette .....	75	60	125
Boulder .....	433	350	123
Total company.....	4,855	4,198	116.2
Denver fixture.....	216	200	108
Windsor .....	54	60	90
Alamosa .....	62	75	82.6
Cheyenne .....	164	200	82
Western division.....	709	930	76.2
Loveland .....	74	100	74
Sterling .....	38	60	63.4
Denver commercial.....	513	1,100	46.6
Special .....	29	125	23.2
Fort Collins .....	64	300	21.3
Window 18, Denver.....	1	10	10
Sales floor, Denver.....	7	150	4.7

The five highest individual accomplishments of the campaign, figured on a numerical basis, were in the domestic division at Denver, placements of units being as follows: F. N. Brewer, 229; Phil Gorman, 212; L. R. Stinson, 203; R. P. Rudesil, 186; B. G. Harrison, 166. Mr. Brewer, who set the pace, averaged nearly 13 units each day. Oscar Rost of the Denver commercial division had a total of 198 units to his credit.

The campaign was directed by G. B. Buck, new business manager of the company.

Total expenditures for newspaper advertising were \$1,758. The two mailings of personal letters totaled 6,000, while the broadside went to 10,000 prospects, including every establishment listed in the territory.

of the two daily papers on Thursday evening, two days previous to the sale.

The results obtained are interesting. A total of 27 lamps was moved, their combined sales price being \$353.81, or an average of \$13.10 to the piece. All but two of the lamps went during the first hour, at the 30 per cent discount. One was sold during the second hour at the 25 per cent discount, while the last one was taken out of the store in the afternoon, when the 10 per cent discount prevailed.

#### Mutton Chops Fail to Work

The same company met a different reaction at Fort Collins. This city is the center of one of the principal lamb-feeding sections of the Rocky Mountains. Owing to the low price prevailing on sheep during the spring, strenuous measures had been taken there to promote mutton eating in Colorado and neighboring states to boost the price and aid the feeders.

Seizing upon mutton as an article of paramount interest in the community, the Public Service Company advertised a one-day portable lamp sale, offering two pounds of choice-cut mutton free with each purchase, with a leg of lamb to each of the first three buyers.

Curiously enough, no mutton was distributed. Several persons looked over lamp stocks, but the day closed without a sale having been recorded.

Fort Collins and Boulder are the same-sized cities, each containing about 12,000 persons.

#### A Free Convenience Outlet

Another unusual and very effective method of making the portable lamp campaign successful was recently

adopted by the Utah Power & Light Company at Salt Lake City. During this sale, which covered a period of about three weeks, the power company agreed to install, absolutely without cost to the purchaser of any lamp in the collection offered, a duplex floor outlet. Approximately three hundred lamps were sold during the period, and the free convenience outlet idea was undoubtedly responsible for a large percentage of such sales.

The resistance which is very often encountered in selling floor lamps, for the reason that the prospective purchaser has no convenience outlet to which the lamp may be attached, was largely overcome in this instance.

Bids covering the installation of these outlets were received from a number of local contractor-dealers, and a flat rate of \$5.75 per outlet was obtained from the successful bidder. The large volume of sales largely compensated the power company for this additional cost.

The free convenience outlet offer was prominently displayed in the company's newspaper advertising, and window displays also conveyed the message to the public.

## Range Campaign of Washington Water Power Successful

During a special campaign conducted from June 21 to July 31, 1926, The Washington Water Power Company sold 309 Westinghouse electric ranges and water heaters over its system, representing gross sales of about \$50,000. This was the second range campaign conducted this year. Of the 309 ranges sold, 214 were installed in the city of Spokane and 95 in the outside territory.

The campaign featured the Westinghouse Junior Cabinet Model, although other models were also sold. Of the total sales, 221 were Junior Cabinets. The only special sales feature was the reduction of the down payment to \$4.75. The ordinary selling policy of The Washington Water Power Company was used whereby in the city the regular salesmen worked on a 10 per cent commission basis with special prizes for the greatest number of sales during each week and during the entire campaign. J. R. Weideman has highest city salesman with 26 ranges to his credit and W. E. Collins second with 23 ranges. The plans and policies were outlined for the city work by Lewis A. Lewis, sales manager, and R. B. McElroy, assistant sales manager, while those of the outside territory were under the direction of J. F. Farquhar, general agent.

It is estimated that these ranges will bring the company a gross revenue of about \$25,000 per year and increase the total number of ranges on The Washington Water Power Company's system to nearly 8,000.

Model Home Displayed in San Francisco.—The \$35,000 home of A. J. Lang of San Francisco, located in Forest Hill, was displayed for a period of three weeks in June as a model electric home. The display was made under the auspices of the San Francisco Chronicle and the realty concern promoting the subdivision. The home was complete in electrical equipment, including range, water heater, air heating and refrigerator.

# NEWS OF THE INDUSTRY

## Hetch Hetchy-Modesto Standby Contract Ratified Over Official Protest

Modesto Irrigation District will receive standby service to the extent of 3,000 kw. from the Moccasin plant of the City of San Francisco as the result of a contract ratified by the San Francisco supervisors. This service will be furnished for a flat charge of \$4,200 per annum and a kilowatt-hour charge of 4.7 mills for all energy used. The contract was protested by both M. M. O'Shaughnessy, city engineer, and John J. O'Toole, city attorney. Modesto will construct immediately a 9,000-kw. substation at a point in the district adjacent to the Moccasin-Newark transmission line.

The ordinance ratifying the contract sets forth that the agreement covers the furnishing of hydroelectric power to the Modesto Irrigation District for pumping and municipal purposes as provided for in the Raker Act, and states that the maximum amount of power to be furnished is not to exceed the total connected load for pumping, irrigation and municipal purposes.

In discussing the contract prior to its passage City Engineer O'Shaughnessy said: "The contract should prohibit this, for the reason that while we are obliged to furnish the district the amount of energy that they require for the specified purposes under the Raker Act at actual cost, we are not obliged to furnish them any energy beyond this, especially when by so doing it will cause the city to lose additional revenue which might bring the total loss of revenue up to more than \$90,000 or even \$132,000 a year.

"To support the general statements that I have made, let us see how this contract as it is now drawn would have worked out for the city if it had been in effect in 1925. In that year

the Modesto Irrigation District used for pumping, drainage and municipal public purposes (which are the so-called Raker Act purposes) a total of a little less than 3,000,000 kw-hr. of electrical energy. According to the statement of their electrical engineer, Mr. O'Connell, the maximum demand at any time during the year for this service amounted to 1,350 kw., and the connected load was 2,300 kw. During the same period of time the total amount of electrical energy delivered to the Modesto District was 9,300,000 kw-hr., and the maximum demand or peak load in distributing this amount of energy was between 4,200 and 4,500 kw.

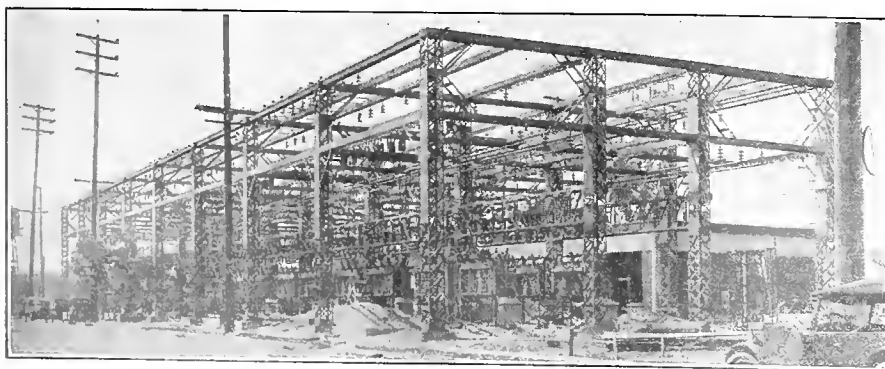
"Now, if the contract was limited purely and solely to furnishing the power for Raker Act purposes during the year 1925, and the district took all the power that they required for those purposes, we would have received from the district the sum of \$14,100 on the basis of 4.7 mills per kw-hr. If this power was used by the district only as standby when their lines were out, the city would have received for this service only \$4,200.

"It is not, however, the intention of the Modesto Irrigation District, nor does this contract bind the district to buy from the city the power required for pumping and municipal purposes. What the district wants and what it aims to get under this contract is what is known as standby service. This means that the district will use its own power plant for operating the pumps and for other purposes specified under the Raker Act, and will call upon San Francisco to furnish electrical service only at such times as their plant or their transmission lines are

out of commission. And what does the contract provide that they pay for this service? The price of 4.7 mills per kw-hr. for the amount of energy actually used, with no reference to or consideration of the load factor. Standby service is not sold or furnished on the basis of so much per kilowatt of energy used. Standby service is sold on the basis of a price per month or per year per kilowatt of demand, plus a rate per kilowatt-hour of energy used. This contract eliminates the demand charge entirely, the most important factor in a standby rate schedule. Established schedules for standby service indicate a rate of from \$10 to \$24 per year per kilowatt of demand plus, say 6/10 cent per kilowatt of energy used.

"The distribution system of the Modesto Irrigation District as constructed makes it impossible for the district in distributing power received from San Francisco's transmission line to distinguish between that which is used for so-called Raker Act purposes and that which is used by private persons or corporations for other purposes. This clearly indicates it is the intention of the district, should occasion arise, to take from our lines sufficient electrical energy to meet whatever the emergency might require for all purposes.

"The furnishing of the power to the district would, on the basis of a maximum demand of 1,350 kw., have resulted in a reduction of revenue under the agency contract with the Pacific Gas and Electric Company of \$42,600, a loss of \$28,500, provided the district bought all of the power they required for Raker Act purposes from the city; if used as standby only, the loss would have been \$38,400. However, let us suppose that the district's plant went out of service while they were connected with the city's transmission lines. Can you imagine that they would not at that time call upon and take from us all of the power that was necessary to meet whatever demand they had to meet at the time the plant went out? If this should occur at a time of their peak load, it would make a demand upon the city of from 4,200 to 4,500 kw. Now, if under any contract that we enter into with the district it is possible for us to be called upon to furnish a demand service of, say 4,200 kw., it will reduce by that amount the dependable peak that the Pacific Gas and Electric Company may count upon from our plant and that company has indicated to the city attorney that they so interpret the contract. If this contention were sustained, it would reduce the obligations of the Pacific Gas and Electric Company to take all of the output of the Moccasin power plant on the basis of an 80,000-kw. peak at a 75 per cent load factor to taking that output on a basis of, say 75,800-kw. peak, and this would result in a reduction of revenue of \$132,500 per year."



Lawrence Street switching center of the Los Angeles Gas & Electric Corporation built to serve the growing industrial district adjacent to Fourteenth and Lawrence Streets, Los Angeles. The present capacity of the station is 5,000 kva., with fifteen 16.5-kv. lines and five 2.3-kv. circuits. Designed to provide for yearly increase in capacity as needed, it ultimately will have about thirty 16.5-kv. circuits and one or two 30,000-kva. synchronous condensers. The cost of the present development is estimated at \$300,000.

## Edison Company's Engineering Department Reorganized

The engineering department of the Southern California Edison Company, Los Angeles, has been subdivided into two parts, one to be known as the civil engineering department and the other as the department of engineering design.

The civil engineering department will be responsible for all reconnaissance, surveys, water records and the determination of all dams, tunnels, flumes, ditches, canals and other works of a civil engineering nature in connection with the company's properties. H. W. Dennis, formerly construction engineer, has been appointed chief civil engineer in charge of the department, reporting directly to G. C. Ward, vice-president. Walter Sawyer has been made Mr. Dennis' assistant. The department will consist of three divisions: preparation of maps under the direction of G. H. Starbuck; right-of-way under H. C. Schofield, and surveys under J. S. Mayall.

Responsibility for the preparation of the designs, plans and specifications in connection with all electric, mechanical and hydraulic work as requested by other departments of the company has been placed upon the department of engineering design. This department will be in charge of H. L. Doolittle, formerly assistant construction engineer, who has been made chief designing engineer, reporting directly to G. C. Ward. The department has been divided into three sections: mechanical, under R. M. Peabody; structural under C. B. Carlson, and electrical under W. R. Battey and J. C. Gaylord, formerly planning engineer of the engineering department, his assistant. The electrical division is subdivided into substation design under C. C. Long, and transmission design and 220-kv. stations under F. H. Mayer.

## Electric Sign Market Development Program Begun by S.E.D.

Members of the advisory committee, appointed by W. W. Freeman, president of The Society for Electrical Development, to sponsor and direct the electrical advertising co-operative market development program, in a recent meeting at the headquarters of the society, agreed that the organization of sign manufacturers for the establishment of business practices which will aid in developing the market profitably is desired by everyone in the industry; and that the program be initiated without further delay by underwriting the minimum organization expenses, preparatory to inviting the united support and membership of companies and individuals engaged in or interested in the sale of commercial electric signs, spectacular electric displays, illuminated poster panels or painted bulletins, traffic signals, directional signs and the like.

In other words, it was decided to postpone distribution of the Plan Book of organization, which was submitted and approved, pending the reports of subcommittees covering survey of the potential market, local sales plan, and recommended basis of membership. Meanwhile the underwriting fund of \$15,000 pledged at the meeting insures getting the program under way immediately.

Following the next meeting of the advisory committee at which time it is expected that the above reports will be ready, copies of the Plan Book, together with membership application blanks, will be sent to all concerns in the industry with the recommended basis for estimating subscriptions, providing for minimum company membership at \$25, the dues of individual members already being established at \$10.

## Power Contracts to Determine Height of Dams on Project

Preliminary steps for the development of the proposed \$20,000,000 hydroelectric project of the Grays Harbor Railway & Light Company, of Aberdeen, Wash., on the Cowlitz River, near Mayfield, are being taken rapidly, W. W. Briggs, vice-president and general manager of the company, reports.

It is probable that two dams will be constructed in the development, Mr. Briggs states, the main one in the vicinity of Mayfield and a second dam at Mossy Rock, a canyon about nine miles above Mayfield. This will create an impounding basin to insure an adequate supply at all times for the main basin at Mayfield. Mr. Briggs states that the height of the two dams will be determined largely by the power contracts that the company obtains previous to the actual construction. Negotiations are now under way with several large corporations which are contemplating plants in the Grays Harbor district, and the amount of power they will require will influence materially the company's plans for development, Mr. Briggs says. The first development plans call for construction of an \$8,000,000 plant.

## Recommends Change of Yosemite Bounds to Develop Power

An adjustment of the boundaries of the Yosemite National Park so as to eliminate twelve acres from the southwest corner of the reservation has been recommended by F. E. Bonner, district engineer at San Francisco for the Forest Service. This change is regarded as desirable so as to permit the development of the power resources of the South Fork of the Merced River. An application covering the project has been filed by the San Joaquin Light & Power Corporation, Fresno, Calif.

A reservoir essential to the development inundates an obscure corner of the park without any claim to scenic beauty. A dam 330 ft. high will make possible the development of 33,800 hp. of primary power.

## Plans Completed for Extension of Skagit Project Railway

Completed plans for the extension of city of Seattle's railway along the Skagit River, as part of the Skagit power project development, have been announced by F. R. Nichols, special engineer of the Skagit project under J. D. Ross, superintendent of the lighting department. In the proposed \$350,000 extension of the railway from the tunnel intake at the present power house to Diablo Canyon, site of a 350-ft. masonry dam, there will be included a 1,170-ft. trestle at a 33 per cent grade. By means of the trestle the company will be able to carry material for building the dam directly to its site. It is estimated that 5,000 tons of material can be carried over the railway daily to the dam site, and that this will insure completion of the dam in seven months after work is started, Mr. Nichols declares. The extension will be 4½ miles long. With the exception of the trestle portion, the new railway will be equipped with trolley; on the trestle will be a cable and carrier car.

## Power Company Seeks License for Flaming Gorge Project

The Utah Power & Light Company has applied to the Federal Power Commission for a license in accordance with its preliminary permit of Aug. 15, 1923, covering the company's proposed development at Flaming Gorge on the Green River. Plans call for the construction of a concrete gravity dam 875 ft. long and 270 ft. high, creating a reservoir 60 miles long with an area of 37,200 acres. Equipment sufficient to develop 63,000 hp. will be installed.

Under a resolution adopted by the commission last year no action is to be taken on any application on the Colorado River or its tributaries, pending an agreement among the states of the basin as to allocation of water. Despite the importance of the Flaming Gorge project, which would regulate completely the Green River above the dam, it seems improbable that the commission will make any exception in the case.

**First Hydroelectric Plant in Samoa Completed.**—The first hydroelectric plant in Samoa has been completed, and the homes and schools of Upolu now are lighted by electricity, according to press report. A dam has been built just above the favorite swimming pool of Robert Louis Stevenson to store water for power generation.



"The old order changeth"—Operators from all over the system of the Public Service Company of Colorado recently paid their respects to "Old Sally," as the venerable 150-hp. Corliss engine shown at the right of the picture affectionately is called. The first steam generation unit ever brought west of the Mississippi River, "Old Sally" was installed in 1882 and furnished the motive power for Denver's entire electricity supply for a number of years. "She" now has a post of honor on the lawn at the company's Valmont plant near Boulder.

## Court Rules Hetch Hetchy Revenue Must Be Used for Redemption and Interest

The supreme court of the state of California has ruled that all of the surplus earnings derived by the City and County of San Francisco from the sale of electric power from the municipally owned Hetch Hetchy plant must be used for the payment of interest on and the redemption of Hetch Hetchy bonds. The decision was rendered in a recent suit brought by Adolph Uhl, suing as a taxpayer and a bondholder, for a writ of mandate to compel the Board of Supervisors to apply all of the surplus earnings from the disposal of Hetch Hetchy power toward debt charges on the 1910 issue of Hetch Hetchy bonds, of which there are outstanding \$38,000,000.

The Board of Supervisors had set a valuation of \$9,000,000 on the Moccasin power house and the transmission line to Newark, both of which were constructed from the proceeds of the 1910 Hetch Hetchy water bonds. Under a contract between the City of San Francisco and the Pacific Gas and Electric Company the power generated at Moccasin power house is turned into the power company's substation at Newark and distributed by that company acting as an agent for the city, at an annual revenue to the city of \$2,000,000. (Journal of Electricity, July 1, 1925, p. 33.) Out of these earn-

ings the supervisors recently had allotted \$83,333 to be set aside for depreciation charges and \$605,000 to cover interest and redemption charges on \$9,000,000 of the Hetch Hetchy bonds, leaving a balance of more than \$1,000,000 which was to be applied to the acquisition or construction of a transmission line from Newark to San Francisco and a step-down station inside the city limits. Mr. Uhl contended that that amount, as well as the \$605,000, should be applied to payment of interest on and redemption of Hetch Hetchy bonds.

The supreme court of the state upheld him in his contention, and the Board of Supervisors immediately filed a petition for rehearing. The petition was denied, with the result that the allocation of the entire surplus of the Hetch Hetchy operating fund—\$1,743,000 as of June 30, 1926—to redeem and pay interest on the bonds has enabled the Board of Supervisors to fix the municipal tax rate at \$3.66. Three weeks ago the valuation of Moccasin power house and transmission line had been raised to \$15,000,000 and the tax rate tentatively set at \$3.77, so that a reduction of 11 cents was made possible through the supreme court's decision. The tax rate for last year was \$4.13.

## New Reduction in Mazda Lamp Prices Effective Sept. 1

Announcement has been made of further reductions in the prices of Mazda lamps, effective Sept. 1, that amount to approximately 7 per cent on sizes generally used in the new standard line of lamps and approximately 5 per cent on all sizes.

This is the eighth reduction in lamp prices since 1920. This latest reduction means a saving to the public of approximately four million dollars per year. Price reductions on incandescent lamps have totaled 44 per cent since 1914 in spite of the fact that the average cost of commodities has increased 65 per cent since then.

With the price of the 40-watt lamp now at 25 cents the consumer may buy six of these for \$1.50, which was the cost of one 40-watt lamp in 1907. For a given amount of money the public buys today more than twenty-one times as much light as was possible in 1880 when the incandescent lamp was new.

The reduction in Mazda lamp prices has been made possible principally by better manufacturing methods, by standardization and simplification of lamp types.

**Paper Mill Purchases Two Carloads of Electrical Equipment.**—Two carloads of electrical equipment, costing \$20,000 recently have been purchased by the Occident Pulp & Paper Mills, Inc., for its plant under construction at Edmonds, Wash. The equipment was purchased from the Allis-Chalmers Manufacturing Company and includes two 12,500-hp. motors, a carload of hydraulic press equipment and two carloads of other machinery.

## Third Radio Trades Exposition Conducted in San Francisco

A third successful radio show has just been completed by the Pacific Radio Trade Association at the Civic Auditorium, San Francisco, with a greater number of exhibits and more comprehensive program than at any of the previous radio shows held in that city.

Exhibits were entered by practically every radio manufacturer, every jobber, and by many of the leading dealers in radio supplies in the Bay region. Booths displaying radio apparatus were this year more elaborate than before, and the models displayed seemed to vie with each other to achieve superiority in furniture craftsmanship.

The Radio Corporation of America conducted a large exhibition in a wing of the auditorium known as Larkin Hall, in which a miniature broadcasting studio was presented behind a glass partition, the music from it being heard over the various sets on display. This was the only audible display allowed in the show, it being conducted in a separate wing. All other exhibits were asked to keep their sets silent in order to prevent a confusion of sound that would interfere with the programs presented during afternoon and evening of each day by radio artists from local studios.

The exposition was held in connection with the annual convention of the Pacific Radio Trade Association. Arrangements were in charge of Arthur H. Halloran, president of the association; Mark E. Smith, exposition chairman; Elizabeth Gray, secretary, and Anthony A. Trempp, exposition manager.

## Two Oregon Utilities Merged to Serve Deschutes Valley

Deschutes Power & Light Company is the name of the new organization formed by the recent consolidation of the Bend Water, Light & Power Company, Bend, Ore., and the Deschutes Power Company, Prineville, for the purpose of making one large utility serve the Deschutes Valley in Oregon. Interests allied with the Pacific Power & Light Company, Portland, and the Bend company recently acquired control of the Deschutes Power Company, the Enterprise Electric Company, Enterprise, Ore., and the Grangeville Electric Light & Power Company, Grangeville, Idaho. (Journal of Electricity, Feb. 1, 1926, p. 114.) In order to facilitate the accounting work of the newly formed Deschutes Power & Light Company all the general books and records will be transferred from the Bend office to the Portland office.

Separate budgets have been made up covering the expenditures for necessary property additions on the Grangeville, Enterprise and Deschutes systems. Items in these budgets include transmission-line connections to relieve shortages, enlarging conductors on transmission and distribution circuits, metering circuits so that the distribution of energy may be known, and other miscellaneous items for the improvement of service. Every transmission-line pole on the Grangeville and Enterprise systems will be inspected, stubbed where necessary and other repairs made so that those systems may be put in good shape before winter, according to present plans.

## Price Reduction Announced by Electro-Kold Corporation

A general reduction in prices ranging from \$30 to \$55 on all models of Electro-Kold refrigerators has been announced by the Electro-Kold Corporation, Spokane, effective Sept. 1.

The new prices are one of the moves in a fall electric refrigeration campaign being waged by all Electro-Kold dealers, according to E. S. Matthews, sales manager, with its objective the increased purchase of electric refrigeration.

## Co-operate in Placing Fabricated Steel Buildings on Market

Buildings of steel, manufactured and erected on the unit principle, have been placed on the market on the Pacific Coast by Michel & Pfeffer Iron Works, of San Francisco, as the result of a co-operative undertaking between that firm, the Pacific Coast Steel Company and the Pacific Sheet Steel Corporation. The new structures will carry the trade name of "Coasteel."

Five types of buildings suitable for any class of industrial structure are being fabricated and carried in stock. The structural steel is produced and fabricated by the Pacific Coast Steel Company, the sheets for side walls and roofs are rolled by the Pacific Sheet Steel Corporation, and the sash and steel doors are manufactured by Michel & Pfeffer Iron Works.

One of the features claimed for the product is that all parts are hot-dipped galvanized. A complete engineering service will be maintained.



## News Briefs

**New Mexico Company to Build Dam in Santa Fe Canyon.**—A reservoir, estimated to cost \$350,000, is to be built in the Santa Fe Canyon by the New Mexico Power Company. The company's application for 3,500 acre-ft. of water a year recently was approved by George M. Neel, state engineer. The dam will have a maximum height of 113 ft. It will be 747 ft. long and 10 ft. wide at the top. Its storage capacity will be 2,979 acre-ft. of water according to information received. The application states that 450 hp. will be developed. Water will be used for domestic and irrigation purposes as well as for power.

**Third Unit at Bonnington Falls About Completed.**—Installation of a third unit of 20,000 hp. at the Lower Bonnington Falls power station of the West Kootenay Power & Light Company, Rossland, B. C., is now about completed, bringing the total installed generating capacity of the system to about 90,000 hp. Work will begin soon on a new development of this British Columbia utility at a site on the Kootenay River where preliminary work now is being done. The capacity has not been determined. The company is a subsidiary of the Consolidated Mining & Smelting Company, supplying power to the mining district of the lower portion of the province.

**First Active Steps Taken in Construction of Wynooche Project.**—The city of Aberdeen, Wash., has taken the first active step toward the construction of its proposed hydroelectric and water project on the Wynooche River. Diamond drilling has been started to determine the best location for the dam. The city has been given a written permit by the Simpson Logging Company to start development of the two projects and right-of-way for a new road will be surveyed and site for main construction camp selected immediately. Five tentative locations for the dam are being considered.

**Edison Company Pushing Work on Vincent Line.**—Work on the construction of the 220-kv. Vincent line is being pushed by the Southern California Edison Company and the lower half of the line from Magunden substation, near Bakersfield, to Laguna Bell substation, south of Los Angeles, is expected to be in operation early in 1927. The northern end of the line will be ready for use some time during the following year.

**Seattle Proposes Low Rates for Power Used for Smelting.**—As a means of bringing new industries to Seattle, an ordinance giving a very low rate for electricity used for smelting purposes has been introduced in the city council. The proposed rate will be four-tenths of a cent per kilowatt during the months of December, January and February, when the peak load on the city light plant is heaviest, and 3.42 mills the rest of the year. The rate applies only to loads in excess of 1,000 hp., and the consumer must purchase exclusively from the city all current he uses for light and power.

**Application to Divert Water from East Truckee River Filed.**—Diversion of 500 sec.-ft. of water for use in connection with a combined hydroelectric and irrigation project in Washoe County is sought in an application filed recently with the California Division of Water Rights by S. S. Wheeler of Reno, Nev. Plans contemplate the development of 11,023 theoretical horsepower. The application asks for permission to divert 75,000 acre-ft. of water annually for storage for irrigation purposes. Cost of the combined project is set at more than \$1,000,000.

**Byllesby Company Surveys for Power Project on Middle Fork of Feather River.**—Surveys for power house and reservoir sites for the proposed Bean Creek hydroelectric project on the Middle Fork of the Feather River have been begun by H. M. Byllesby & Company, Chicago. Actual construction work on the project will not be commenced until after receipt of permit from the Federal Power Commission, according to announcement by the company. The holdings on the Middle Fork of the Feather River to be utilized in the development were acquired from the Feather River Power Company. (Journal of Electricity, Oct. 15, 1925, p. 306.)

**San Francisco to Survey Street-Lighting System.**—A comprehensive survey of San Francisco's street-lighting system with a view toward complete elimination of antiquated gas lamps and their replacement by modern electric fixtures will be undertaken within the next few weeks. The proposed survey was authorized by the Board of Supervisors and approved by the mayor early in July. It is believed that a thorough survey of the lighting system will result in a substantial saving to the city. The absence of method in the development of street lighting has resulted in lack of uniformity and efficiency, according to members of the lighting committee of the Board of Supervisors. A plan is expected to be worked out, in conjunction with the Board of Public Works and the Department of Electricity whereby all lighting standards in the residential section will be brought to a uniform design.

**Ranchers Protest Further Appropriation of Water from Skokomish River by Tacoma.**—Complaining that the city of Tacoma's contemplated move of installing an additional unit to its Lake Cushman power project, lately placed in operation, would require the taking of most of the flow of the water from the south fork of the Skokomish River, forty-five ranchers living in the valley below the point of the proposed diversion have filed formal protest with the state hydraulics office urging that such action be restrained. The farms, dependent upon floods and irrigation, would be rendered worthless, it was claimed.

**Geological Survey Completes Survey of Idaho Rivers.**—A survey of power sites on the Snake River between Milner and Weiser, Idaho, on the Salmon River below Salmon, and on the Clearwater River and its tributaries, in Idaho, recently has been completed by the United States Geological Survey, and detailed maps have been prepared. These maps are now on file in the Boise office of the United States Geological Survey.

**Seattle City Council Accepts Warranty Deed from Puget Sound Company for Two Substations Purchased.**—The city council, Seattle, has accepted a warranty deed from the Puget Sound Power & Light Company for two substations purchased, but with the provision that this acceptance is not an admission that it will pay more than \$119,734 for the properties. The company sets \$185,000 as a fair price, and a court fight looms over this price matter. The substations are purchased under an agreement made when the city acquired the street railway.



### Highways for Electric Service

POWER LINES of this Electric Service company reach out from the generating stations and cover the Inland Empire with a network of "highways" for the electric energy so vital to community comfort and development.

- ¶ Steel towers and the cedar pole lines carry this energy at high voltage and the service lines, in turn, distribute it to the very door of the customer.
- ¶ The "little black box" on the pole in your neighborhood is a transformer which reduces the voltage ready for use in the electric lamps, range and appliances within your home.
- ¶ With the power stations and the substations, the power lines are also at your service when you turn the electric switch or push the button.

You Are Invited To Visit Our Power Stations

**The Washington Water Power Co.**

Serving 45,000 customers in sixteen counties of Washington and Idaho

One of a series of advertisements published by The Washington Water Power Company, Spokane, in an effort to familiarize its consumers with the mechanism of a power system. This is one method adopted by the company to portray what goes on "Behind the Button."

**Women's Committee, Washington Water Power Company, Stages Resuscitation Demonstration.**—The resuscitation team of the Women's Committee of The Washington Water Power Company, Spokane, recently gave a demonstration at the Community Center, Glover's Field, before a group of about thirty Indian women and a number of local club women during the Indian Congress. The demonstration accompanied a talk on accident prevention given by J. B. Fiske, consulting engineer for the company. The team was composed of Miss Edna Cottrell, Miss Norene Calfa, Miss Alfernia Culler and Miss Ruth Wilson.

## Book Reviews

### TELEPHONE COMMUNICATION.

By Charles Allen Wright, professor of electrical engineering, The Ohio State University; with the collaboration in the development of Part II and Appendix A of Albert Frederick Puchstein, assistant professor of electrical engineering, The Ohio State University. First Edition, 1925. 515 pages, 292 illustrations, 2 appendices, 26 tables. McGraw-Hill Book Company, New York. \$5.

Specialization, so necessary in every activity of today, is the reason for limiting the detailed discussion in this book to "medium-frequency" alternating currents and electromotive forces, i.e., those of frequencies between 20 and 10,000 cycles per second.

The book is designed for use as a textbook "by students who are unfamiliar with literature on communication."

While the treatment of some phases of this broad subject is brief and general, valuable lists of references are given at the end of each chapter together with helpful questions and answers. Almost all of the fundamental electrical apparatus is illustrated even though the authors evidently expected a laboratory would be available to the classes so that they might carry out certain experiments outlined in an appendix. Another appendix contains electrical fundamentals which apply directly to medium-frequency apparatus and lines.

Holding to the premise of discussing only medium-frequency involves omission of chapters on signaling circuits and equipment but does not seem to exclude a chapter on the relation of wire telephony to radio telephony, which makes use of frequencies of far more than 10,000 cycles per second. A brief exposition of the signaling apparatus and connections would help to round out the general treatment of "communication," especially when one considers that the modern ringing frequencies are within the band defined by the author as "medium."

Maintenance of telephone plant is divided into two parts, maintenance of apparatus and circuits, and inductive interference and crosstalk. Both of these are well covered particularly from the practical standpoint.

Careful perusal of this book will help the reader better to understand the problems and accomplishments of one of the most interesting industries which, nevertheless, are accepted as commonplace today.

### CONTROLLERS FOR ELECTRIC MOTORS

By H. D. James, B.S., M.E., Fellow A.I.E.E., etc. 522 pages, 444 illustrations, 6 x 9 in., cloth bound. Second edition, completely revised and enlarged, 1926. D. Van Nostrand Company, New York City. \$5.

This is a treatise on the modern industrial controller, together with typical applications to various industries. The object of its preparation was to bring together in one volume sufficient material on control apparatus to give a good general idea of its design and

operation. It should be of service to technical students, operating engineers and others interested in controllers and control equipment.

The text is divided into 38 chapters dealing with as many different phases of the subject. The first 10 chapters are devoted to more or less elementary discussions for the benefit of those of small experience with control apparatus including the making and reading of controller diagrams and different methods of motor acceleration. Roughly dividing the text further, the second 10 chapters discuss various types of apparatus and methods of control. The concluding 18 chapters give details concerning typical applications of the different types of control equipment to all of the important industries and their machines.

**Foreign Developments.**—Serial report of the prime movers committee, N.E.L.A. Gives progress made in steam power plants in Austria, England, France, Germany, Italy, Japan, Russia, Scandinavia and Switzerland. Published July, 1926. Price to members 25 cents.

**Year Book of American Engineering Standards Committee, 1926.**—This is a 76-page booklet giving the present status of the various standardization interests of the organization and other pertinent information. Published by the committee at 29 West 39th Street, New York City.

**Guides for Specifications Covering Electrical Apparatus and Equipment.**—Serial report of the electrical apparatus committee, N.E.L.A. Published July, 1926. The various aspects entering into the use of specifications both from the standpoint of the operating and the manufacturing companies are discussed briefly. The need for standardization in specifications is emphasized. Fourteen guides designed to aid in the preparation of specifications are presented. Price to members 30 cents.

**Second Technical Conference of State Utility Commission Engineers.**—This is Miscellaneous Publications No. 66 of the Bureau of Standards and is a detailed report of the proceedings of the meeting indicated by the title held in Washington, D. C., March 6 and 7, 1924. Price 15 cents.

**Electric Power Survey.**—This is a survey made by the power survey committee of the N.E.L.A., Great Lakes Division, in collaboration with three adjoining divisions. Information has been drawn from all available sources for the preparation of this report. Numerous charts, diagrams, tables, maps and other illustrations make the information contained in the report readily understandable. For anyone interested in the power situation in the nine states centering roughly at Chicago, this 84-page report should prove to be of value.

Published by the N.E.L.A., the reports are available at the price of one dollar each.

## A.I.E.E. News

A Meeting of the San Francisco Section will be held Friday, Sept. 17, at 7 p.m. in Yosemite Hall, Native Sons Building, 414 Mason Street, at which Cummings C. Chesney, president of the American Institute of Electrical Engineers, will be the principal speaker. His subject will be "Research and Standardization." Other speakers on the program will be F. W. Peek, Jr., who will discuss "Lightning," and K. B. McEachron, who will talk on "Lightning Protection." The meeting will be preceded by the usual dinner at Marquard's Cafe, Geary and Mason Streets, at 5:45 p.m.

## Pacific Coast Electrical Association

### Continuity of Committee Work in Engineering Section Now Showing Good Results

Advantages accruing from the vice-chairmanship plan now are making themselves obvious in the work of the Engineering Section. Most committees were organized completely and functioning prior to the sessions held in Los Angeles Sept. 1-3. Those that were only partly organized required but little time to complete the job and take up the studies of the 1926-27 term. Every committee had at least some preliminary reports ready for submission and discussion.

All business sessions except one were held in the office building of the Los Angeles Gas & Electric Corporation, where J. G. Rollow, section chairman, made full arrangements for the

comfort, efficiency and convenience of those in attendance. The first executive committee meeting was held the evening of the first day at the Jonathan Club. At that meeting the intended programs of the various committees were verified and the work properly apportioned among them. Vice-chairmen for the coming year were selected, the list thereof to be published as soon as all appointments are confirmed.

#### Chicago Group Meeting

Continuation of the full co-operation with the Eastern geographic divisions is to be an important part of the work of the P.C.E.A. Engineering Section

for the present year. Those selected to go to the Chicago meeting Oct. 13-15 are as follows:

J. M. Gaylord, Southern California Edison Company, chairman hydraulic power committee.

M. S. Slaughter, The Southern Sierras Power Company, chairman accident prevention committee.

L. J. Corbett, Pacific Gas and Electric Company, chairman inductive co-ordination committee.

A. J. Hall, Ontario Power Company, chairman meter committee.

E. J. Crawford, San Joaquin Light & Power Corporation, chairman safety rules committee.

C. E. Young, Pacific Gas and Electric Company, chairman overhead systems committee.

J. G. Rollow, Los Angeles Gas & Electric Corporation, chairman Engineering Section.

### Luncheon Meeting

Following an established custom, all delegates and many visitors attended a luncheon meeting held at the Elite Cafe the second day; the total attendance was 115. President Coleman of the P.C.E.A. was scheduled to speak at the luncheon, but was prevented by a severe illness. Those in attendance deeply regretted the president's ill fortune and authorized a telegram to that effect. "Jack" Frost, commercial manager, Southern California Edison Company, and first vice-president, P.C.E.A., spoke in place of Mr. Coleman. He commended the Engineering Section upon the serious nature of its work and upon the efficiency with which it was despatched, stressing the vital importance of the engineering achievements in the development of the electric utilities. Mr. Frost particularly emphasized the fact that it is the duty of every company employee to boost the greater use of electrical energy wherever and whenever possible.

Activities of the various committees are covered best by the brief reports of the chairmen presented in the following paragraphs:

### Accident Prevention Committee

By M. S. SLAUGHTER, The Southern Sierras Power Company, chairman.

Of special importance in the work of the committee for the present year is the matter of full co-operation with the national committee. This is stressed in the hope of increasing the scope of accident-prevention work among member companies.

Further to increase the interest of company executives in this work it is necessary to prove concretely the value of such efforts. Also it is necessary to furnish plans for accident-prevention organization and to establish and maintain a close contact between the committee and the executives.

Safe-practice codes built around the code submitted to the committee last year by Dickinson and Jordan of the Pacific Gas and Electric Company, but varied to suit local conditions are recommended by the committee. Copies of that code are to be circulated among member companies.

Papers were presented by S. M. Bullis of the California Oregon Power Company on Educational Publicity by L. L. Dyer of the Southern California Edison Company on Safe Practices in Station Operation; and by D. G. Masey on Safe Practices on Construction Jobs. These papers are to be parts of a more complete study of those subjects.

### Electrical Apparatus Committee

By H. A. LAIDLAW, Pacific Gas and Electric Company, chairman.

Six topics of study for as many subcommittees were decided upon:

Oil Circuit Breakers; Relays; Station Design Practice; Fire Protection and Prevention; Operating Methods, Routine and Experiences; Transformers and Regulators.

Each of these subjects aroused manifest interest and lengthy discussion.

Performance of automatic reclosing equipment came under the first topic. Manufacturers' representatives advised of the latest developments in contact designs and assemblies. An interesting example was cited of the use of slow motion pictures for the study of breaker operation. Relay discussions covered the latest developments and applications. Fire protection

was a very live subject, bringing forth descriptions of operating experiences and various tests upon various types of extinguishers. Active discussion also took place concerning transformers and regulators. The chairman advised that it was the intention that the subcommittee consider only station-type power transformers, excluding distribution transformers.

Fuses and circuit breakers for the protection of transformer banks, automatic voltage regulators for range-load circuits, single-phase versus 3-phase regulators, proper relay protection for automatic reclosing circuits, effect of arc-furnace load upon service conditions, control batteries, charging equipment, water softeners, and cooling towers are some of the subjects eliciting discussion. Stress was laid upon the necessity of planning control circuits to prevent disruption from break-down of other equipment.

Two automatic stations of the Pacific Gas and Electric Company were covered in a paper submitted by R. B. Kellogg of that company. A. W. Copley of the Westinghouse Electric & Manufacturing Company gave some sidelights upon his company's latest developments, including a new rectifier for charging radio batteries, a light-sensitive vacuum tube, a 9-element oscillograph, and new a.c. network relay equipment.

### Hydraulic Power Committee

By J. M. GAYLORD, Southern California Edison Company, chairman.

Dr. N. W. Cummings presented a final report of his research on evaporation from lakes and suggested certain further investigations which he believed would lead to useful results. The report was discussed by O. A. Wait, Dr. G. L. McEwen and others. The consensus of opinion appeared to be that the expense of applying the Cummings method to a power storage reservoir probably would be greater than the value of the more exact information to be obtained by this means. The method should prove useful, however, where more precise determinations are essential. By introducing certain approximations, it seems probable that a simpler method can be worked out which will give results sufficiently accurate for most practical purposes.

It was decided to complete the report on the theoretical part of the subjects of water hammer and speed-regulation of water wheels without waiting for experimental tests now in progress. A new subcommittee with S. F. Coghlan of the Southern California Edison Company as chairman will be formed to prepare a report on water-hammer tests.

Revision of the penstock report of 1923 was completed and will be embodied in a final report to be submitted to the national committee for publication.

Outlines of the proposed work of the year on penstock valves, pressure tunnels, handling of stored water, mechanical reliability of hydro-electric units, and penstock painting submitted by the chairman of subcommittees were discussed.

H. L. Doolittle, chairman of the national hydraulic power committee, discussed the work of his committee and asked for suggestions of additional subjects to be taken up. The subjects of stored water, pressure tunnels and penstock valves which originated on the Pacific Coast will be submitted for adoption by the national committee at its October meeting in Chicago. J. W. Andree of the Southern California Edison Company was appointed to serve on the national subcommittee on testing and operating records of water wheels. A new subcommittee will be formed to co-operate with national subcommittee on experiences with different types of dams.

Time did not permit a detailed discussion of the proposed work on silt deposits, but it was decided to continue this work by a subcommittee under Clinton De Witt of the Pacific Gas and Electric Company.

J. W. Andree presented a paper on the combined operation of hydraulic and steam plants, describing the methods used by the Southern California Edison Company in securing maximum system efficiency. The paper was discussed by W. D. Skinner of the Pacific Gas and Electric Company who stressed the importance of the savings possible by proper study of this subject.

### Inductive Co-ordination Committee

By L. J. CORBETT, Pacific Gas and Electric Company, chairman.

Activities of this committee divide themselves under three heads.

1. Inductive Co-ordination Between Power and Communication Lines. This is the subject of the committee's original work. H. N. Kalb reported a case of a transmission line along a railroad where the railroad commission permitted longer barrels than would have been permitted under strict observance of General Order No. 52 of the commission. Mr. Corbett described the transposition method used on the Manteca-Salinas 104-kv. line in which both flat and triangular configuration are involved. J.

O. Binney promised a report of the Edison company's Vincent telephone line exposure to the Vincent 220-kv. line. The Postal Telegraph Company's case with the Pacific Gas and Electric Company's Bay line between Sacramento and Suisun was described by Mr. Corbett. A portion of the Postal line was moved and successive tests showed the induction to have been reduced by 75 per cent of its former value.

2. Radio Interference. A report of the Pacific Gas and Electric Company covered 606 radio complaints against its lines during the first six months of 1926. In the same time 625 cases were cleared. The 11-kv. switches and cut-outs are the main source of trouble, but poor bonding and loose hardware contribute. That company has six "Radiola-26" sets and one Western Electric "4-B" set in use for investigating radio complaints. The Southern California Edison Company uses 2-tube Crossley sets in the districts, backed up by a "Radiola-26" for the use of the engineering department. The complaint form distributed to dealers by the Pacific Radio Trades Association was exhibited and its merits outlined.

3. Power-system Communication. (a) By telephone lines; methods of protection and testing were discussed and will be further reported upon with the view of standardizing at least elements of equipment. (b) By carrier current on high-voltage lines; comparative tests of three different types of equipment on the lines of the Pacific Gas and Electric Company were discussed. The Western Electric system in use by the Los Angeles Bureau of Power and Light and the General Electric system in use on the Edison 220-kv. lines were described.

### Meter Committee

By A. J. HALL, Ontario Power Company, chairman.

The subcommittee on education of metermen has definite plans for two courses to be held next spring. One of these will be at the University of California, Berkeley, and the other at California Institute of Technology, Pasadena. Details of the courses now are being worked out.

The subcommittee on new developments has made great progress and will have a good report. Stress is being laid upon developments worked out by the utilities. Members present were greatly interested in a rotating standard developed by the Pacific Gas and Electric Company.

The committee on special tests and investigations is preparing papers for discussion at the next meeting.

### Overhead Systems Committee

By C. E. YOUNG, Pacific Gas and Electric Company, chairman.

All subcommittee chairmen were present, their committee organized and reports ready for presentation. A brief outline of the proposed activities of the committee was presented by Mr. Young. In brief, the sessions of the committee covered the following:

H. Michener touched briefly upon practical features of tower-line construction and troubles which develop in the operation of high-voltage lines.

Corrosion of tower metal aroused lengthy discussion. E. R. Stauffacher, Southern California Edison Company, was appointed chairman of a subcommittee to study the subject of corrosion of tower metal and line hardware.

H. H. Buell reported on experiments conducted by some Eastern companies covering the frequent grounding of 4-kv. primary neutrals. Discussion regarding the use of a common ground for both primary and secondary followed.

J. E. Macdonald gave an outline of the work done during the past two years in connection with the revision of the railroad commission's General Order No. 64. R. O. Waltham of the commission reported upon the progress made in the revision of the order and outlined the most important changes. Joint-pole work was discussed and it was agreed that the committee should study the standardization of prices, pole numbering and similar subjects.

K. B. Ayres presented a report covering line switches and protective equipment. Discussion following involved the question of the best practice in connection with the use of 4-kv. and 11-kv. sectionalizing switches, cut-outs, fuses and the use of different fuse alloys, and high-voltage line switching.

L. J. Corbett in reporting on the standardization of pin and insulator threads announced that a standard insulator gage is well on the way to completion and that it checked closely with the N.E.L.A. standard. Discussion brought out the economy that would be effected by the adoption of such a standard, principally in the reduction of insulator stocks to be carried by the manufacturers.

H. H. Minor gave further information on the use of live-line tools. It was suggested that the committee make some definite recommendations regarding the special training of men for the use of such tools.

E. Y. Porter reviewed the subject of the treatment and life of poles, recommending the treatment of stubs. R. E. Cunningham gave some interesting information regarding methods of treating fir poles.

### Prime Movers Committee

By C. W. WIGGINS, San Diego Consolidated Gas and Electric Company, chairman.

J. W. Andree made a preliminary report on standby plant design and operation. After the discussion which followed he stated that his committee will investigate methods of operating standby plants and costs of operating by the different methods, also methods of protecting the plants against corrosion and deterioration while out of service. Mr. Andree stated that it is doubtful if any plant should be designed as a standby plant because all plants usually become standby plants as more modern plants are built.

F. R. Knight, in a preliminary report of the boiler and turbine-room instruments committee, stated that it is the purpose of that subcommittee to make a comprehensive survey of instruments used by member companies, to determine those that have given complete satisfaction and to determine, if possible, the troubles they have had and the remedies applied.

A special study of methods of measuring fuel oil and of instruments for measuring non-condensable gases from condensers will be made.

F. G. Philo made a preliminary report on the operation of the No. 2 Long Beach plant of the Southern California Edison Company. He also presented some data on a new plant which the Southern California Edison Company is planning to build soon.

Mr. Philo stated that the new plant now being planned will contain a 100,000-kw. General Electric single-shaft turbine-generator with four vertical single-pass condensers. The boilers will be 3,400-hp. B. & W. cross-drum type operating at 450-lb. pressure and 1750 deg. temperature.

E. D. Sherwin outlined plans for the committee on boilers, furnaces and accessories.

Scott Jensen presented a most excellent preliminary report dealing principally with methods of cleaning condenser tubes and methods of locating leaks. Samples of split tubes were exhibited showing the effects of different methods of cleaning.

### Safety Rules Committee

By E. J. CRAWFORD, San Joaquin Light & Power Corporation, chairman.

Testing facilities to be incorporated in entrance switches was reported upon by its subcommittee and a tabulation of data collected from member companies submitted. Indications are that something definite will be accomplished on this subject during the year. The matter is to be passed to a new subcommittee for completion.

The use of a common primary and secondary ground was discussed and held open pending communication with the overhead systems committee.

Safety regulations were discussed and an understanding reached as to co-operation with the national accident prevention committee. This committee is to study the code prepared by the national committee and make recommendations as to which rules should be adopted by P.C.E.A. companies.

State electrical safety rules received consideration. It was decided that at present there is none requiring the committee's attention.

The establishment of a general uniform or common ordinance throughout all California counties aroused extended discussion. Such an ordinance would assist in procuring safer and more adequate electrical installations. The committee is to communicate with the California Electrical Inspectors Association and assist in every possible way the preparation and adoption of a uniform electrical ordinance.

### Underground Systems Committee

By N. B. HINSON, Southern California Edison Company, chairman.

A report of the last (Kansas City) national group meeting was presented by H. H. Buell who also gave some interesting information regarding the 132-kv. cable installations under way in New York and in Chicago.

The problem of adequate heat transfer from cables through the duct and the enclosing concrete envelope was discussed. Some experimental installations have been made and definite results will be available in the future.

Cable testing with Kenotron equipment is to be carried on by the Los Angeles Bureau of Power and Light upon the final completion of the equipment installation now being made. A number of committee members visited the Bureau laboratory to see the equipment.

Manhole and transformer-vault construction discussion brought out the fact that the long, narrow vaults now used almost universally permit a stronger roof construction than the

older type. They also require less street space, in width. Conduit, and particularly the monolithic construction adopted in the East for the 132-kv. cable lines aroused discussion. The use of powdered soapstone reduced the cable-pulling stresses by about 50 per cent on those jobs.

Electrolysis is another subject of considerable interest. A report covering surveys made on several systems is to be prepared by the committee. Joint use of duct lines by different utilities in light-load areas seems to have been proved economically feasible. Such practice reduces construction costs and is more or less analogous to the use of joint-poles.

Underground a.c. networks for the larger communities were recommended by R. R. Cowles who cited the success attendant upon such systems in Eastern cities. This aroused lengthy discussion. Consensus of opinion seemed to be that Western conditions do not justify the changes and additions that would be required by the adoption of such a system.

### Next Section Meeting

Tentative plans contemplate the holding of the San Francisco sessions of the Engineering Section Jan. 12-14, 1927. This is subject to final confirmation at a later date.

### Advertising-Publicity Section Discusses Direct-Mail Use

Jean Blum, manager of Blum's Advertising Agency of San Francisco, delivered a searching and comprehensive talk on the use of direct mail in electrical advertising at the afternoon open session of the Advertising-Publicity Section, Pacific Coast Electrical Association, held at the Palace Hotel in San Francisco Sept. 10. Richard E. Smith, advertising manager, Southern California Edison Company, Section chairman, presided. A number of visitors from the electrical industry attended the meeting to hear and take part in the discussion which followed Mr. Blum's paper.

"As an advertising medium," said Mr. Blum in a remarkable statement, "direct mail does not always justify its cost, but as a sales medium direct mail is the most effective tool in modern business. It co-ordinates but does not compete with any form of advertising."

Mr. Blum analyzed the possibilities with direct mail from the manufacturer's standpoint, the jobber and contractor's angle, and from that of the retail supply dealer. Beginning his paper with a survey of the industry, he stated that the industry represents 6,250 central stations, 1,800 manufacturers and jobbers and approximately 47,000 retail outlets. In the home field, he stated, was to be found the greatest potential market.

In the home field, Mr. Blum said, educational advertising was needed. Talking to the woman in the home, he said, requires an understanding of her problems as she sees them. Electrical advertising should try to remove prejudice due to fear of danger, costliness of the appliance and the intricacies of handling it. The mystery angle should be overcome, he declared emphatically. Advertising should stress the economy of consumption and lasting qualities of the appliance. Mr. Blum said, adding that charts are better understood than verbiage.

"I am stressing these points because it must be remembered that electrical appliances do not carry the same appeal to a woman as would wearing apparel or home furnishings," he went on to say. "Taking one point at a time and presenting it clearly and in plain language will accomplish more in electrical advertising than the use of large space and technical description covering too many angles. Unlike the

industrial field, where facts and figures are necessary, the woman in the home will assimilate less of the facts and more of the information which appeals to her if given to her in small doses."

He outlined the forms of campaigns to be used for manufacturers and jobbers, then for retail supply dealers. One point made was that, "You can't expect the average dealer to present all the salient sales arguments about your product to his customers and prospects. He may have a large supply of a competing manufacturer's product on hand. His interest in your product may be limited to calls resulting from your advertising effort, while his sales effort may be easily swayed in favor of something else."

He outlined what he would do in a typical case of washing-machine selling as an example and read of the results obtained by various large organizations in the use of direct mail. Mr. Blum's talk was followed by lively discussion, many in his audience availing themselves of the opportunity to get his opinion and the benefit of his experience in answer to problems. J. Charles Jordan was chairman for the special discussion session.

During the morning business session of the Advertising-Publicity Section places of meeting and subjects for study for the year were decided upon. The next meeting is to be in Los Angeles in November, at which time the study topic will be "Behind the Scenes," or a discussion of the mechanics and detail of operating an advertising or publicity department in an electrical business. Dan Scott, manager public relations, Los Angeles Gas & Electric Corporation, was named chairman for that discussion, with J. Charles Jordan, manager publicity department, Pacific Gas and Electric Company, principal speaker.

Following this meeting, another will be held in San Francisco in February, and the subject will be "House Organs," with Frederick S. Myrtle, editor Pacific Service Magazine, presiding, and J. P. Coghlan, assistant to the president, Pacific Gas and Electric Company, principal speaker. At the meeting to be held in Los Angeles in April, with the subject, "Supplementary Advertising," R. G. Kenyon, Southern California Edison Company, will preside, and speakers qualified to represent all forms of advertising outside of newspaper and periodical advertising will be heard.

S. Waldo Coleman, president of the Pacific Coast Electrical Association, addressed the members of the Section informally at the noon luncheon, speaking of the interdependence of various departments in the operation of the electrical industry and of the part destined for advertising and publicity men. With increasing business the personal touch was being lost between the executives and the public and the employees, he said, and it was the duty of advertising and publicity men to bridge the gap and maintain contact between them. He said that he foresaw more participation by stockholders in company activities and that it was the duty of advertising men to keep them informed and familiar with the activities of the companies so that their confidence in the management would continue and that no obstacles would be placed in the path of efficient operation through ignorance of policies and methods.





# News of the Electragists



## Twenty-fifth Convention at Cedar Point Largest in Electragist Annals and Most Successful

With a registration of 850, the twenty-fifth annual convention of the Association of Electragists, International, at Cedar Point, Ohio, Aug. 24-27, was declared not only the largest in the history of the organization but one of its most successful as well. Speakers from all branches of the industry addressed the meetings.

In the principal address on the opening day, Gerard Swope, president of the General Electric Company, laid stress on the necessity for good workmanship. "The public is perfectly able and willing to pay a fair price for a

good article and a good service," he said. He maintained that there must be a fair profit and that electragnists need to know costs and to account for them. He urged that the standards of business policy and practice being set up be regarded not maximum as requirements but minimum alone.

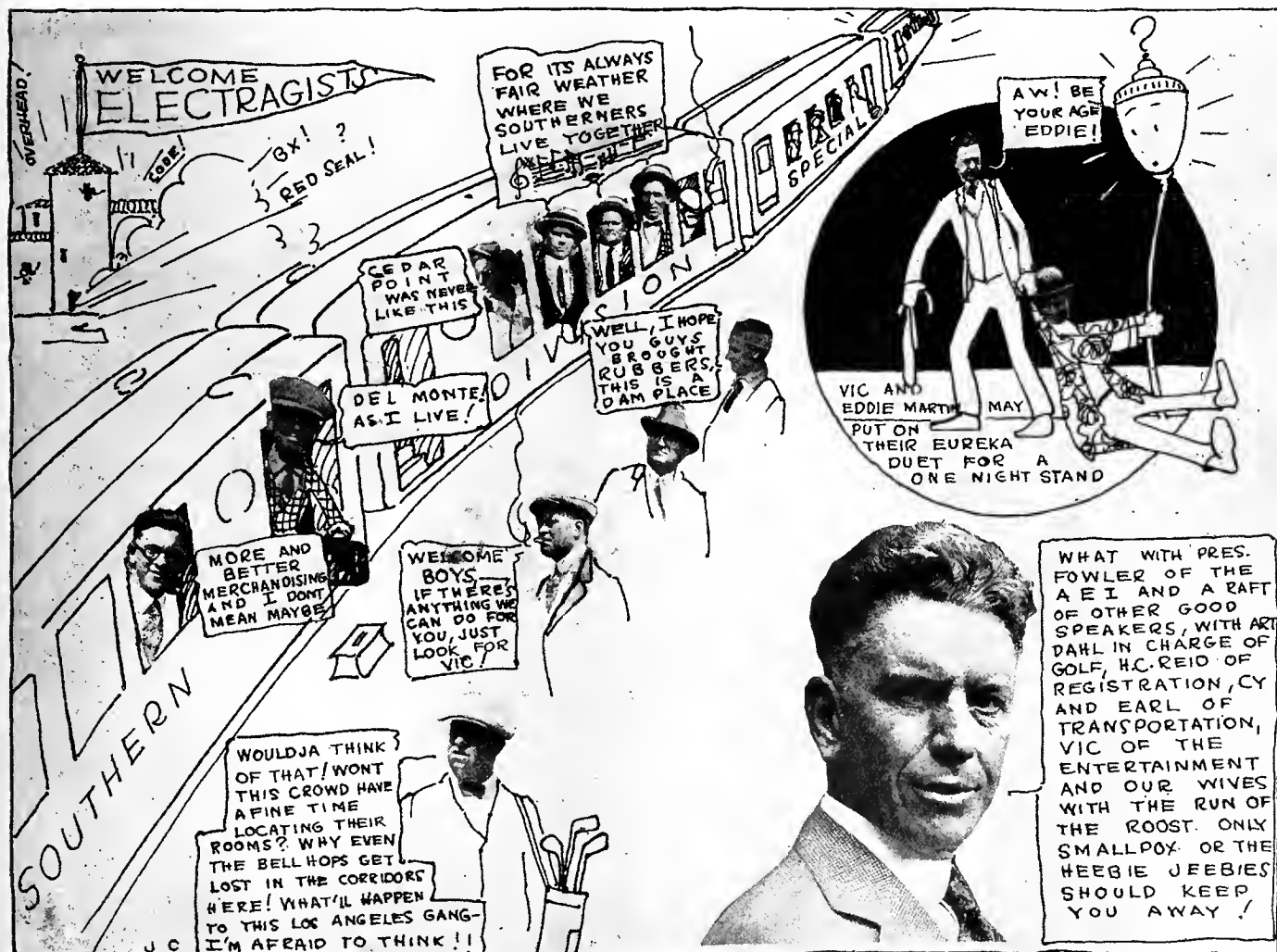
President Joseph A. Fowler in his address discussed the difference of opinion sometimes prevailing between central station and electragnists on the trend in wiring. A joint conference of all four branches of the industry, he anticipated, would bring about better

understanding on this point. "Something must be done," he said, "lest in our eagerness to get every house connected we accept the false philosophy of 'Better to be wired and burnt than never to be wired at all!'"

The James H. McGraw contractor-dealers' medal and purse for 1926 was awarded to Louis K. Comstock. Certificates of honorable mention were extended to Arthur L. Abbott, G. Fred Laube and Charles E. James. (Details of these awards appear in another article.)

W. Creighton Peet presented to the convention a most comprehensive report of the trade committee, analyzing the "balance sheet of distribution." This report held that the natural chan-

WILL YOU BE AT DEL MONTE, OCTOBER 1, 2, 3, WHEN NORTH MEETS SOUTH FOR THE CALIFORNIA ELECTRAGISTS' CONVENTION?



nels of distribution should be from the manufacturer to the jobber to the contractor-dealer to the public, and emphasized the necessity for keeping this balance. Where the contractor-dealer is passed by, the report demonstrated, not only is an injustice done to the contractor-dealer but the position of the industry is weakened economically and the balance upset.

Among other papers or talks presented the one by G. Fred Laube giving a description of the success in electrical merchandising he had experienced by means of sales policies he outlined, held attention. A series of practical papers on the technical and business problems of the contracting business occupied the second day of the convention.

C. J. Geishush, executive secretary, California Electragists, Southern Division, reported the success of the estimating classes held in California. On Friday two symposiums on the following questions were held, namely: "Should there be set up an electragist standard for wiring installations?" and "Is state or municipal licensing of electrical contractors needed, and if so, in what form?"

### McGraw Awards Presented at Cedar Point Convention

The second annual presentation of the contractor-dealer medal and purse given under the James H. McGraw Award was a feature of the opening session of the Convention of the Association of Electragists International at Cedar Point, Ohio. The bronze medal and the purse of \$100 in gold were awarded to Louis K. Comstock, and certificates of honorable mention were extended to Arthur L. Abbott, Charles E. James and G. Fred Laube.

Mr. Comstock is chairman of the board of L. K. Comstock & Company, New York. The bronze medal was given him in recognition of his valuable work in linking the National Association of Electrical Contractors and Dealers and the International Brotherhood of Electrical Workers through the establishment of the council of industrial relations.

Arthur Abbott, technical director, A.E.I., was given certificate of honorable mention for his work on cost data and estimating for the association and establishment of estimating schools. Charles E. James, president, the Lektrik Shop, Fort Pierce, Fla., was awarded certificate of honorable mention for his work in organizing Florida contractors and notable work in connection with that organization. G. Fred Laube, president, Laube Electric Company, Rochester, N. Y., also received the certificate for his unusually high class merchandising efforts in the establishment of an "electrical department store" and the influence he has had in raising merchandising standards.

The James H. McGraw Award was established last year by Mr. McGraw "to encourage constructive thinking for the advancement of the electrical industry." Its permanence has been secured by an endowment given into the keeping of the Society for Electrical Development. Each year four bronze medals are awarded, each accompanied by a purse, to those men who are judged to have done most for the advancement of the manufacturing, jobbing or contractor-dealer branches of

the industry or to promote co-operation between any two or more branches of the industry. The judges appointed this year by the Association of Electragists to make the contractor-dealer award were: C. C. Bohn, J. C. Hatzel, W. Creighton Peet and George Wiederman. The presentation was made by Earl E. Whitehorne, commercial editor of the *Electrical World*, in behalf of the committee of awards.

### California Inspectors' Committees Announced by President

Committees appointed by Ben C. Hill, city of Oakland, president of the California Association of Electrical Inspectors, to carry on the work of the association for the year, were announced recently by C. W. Mitchell, secretary. The chairman of each committee was asked by the secretary to get in touch with his committeemen so that the work of the association might progress. The list of committee personnel follows:

**Articles of Association Committee.**—H. N. Beecher, Los Angeles, chairman; J. M. Evans, Los Angeles.

**Ordinance Statistics Committee.**—C. W. Mitchell, San Francisco, chairman; G. E. Kimball, San Francisco; L. S. Bush, San Francisco; J. M. Evans, Los Angeles.

**Ordinance Committee.**—J. M. Evans, Los Angeles, chairman; O. Barnwell, Beverly Hills; James McConahey, Los Angeles.



D. M. Bird, electragist of Chico, Calif., caught with his sleeves rolled up all ready for a hard day's work. Mr. Bird is proprietor of the Bird Electric Company.

**State Safety Orders Committee.**—C. E. Hardy, Oakland, chairman; R. H. Manahan, Los Angeles; R. W. Wiley, San Francisco.

**National Electric Code Articles 1, 2 and 3 Committee.**—K. J. Bickel, Martinez, chairman; W. E. Brothers, Berkeley; C. Drathman, Redwood City; M. L. Hutchinson, Monrovia.

**N. E. Code Arts. 4, 8, 12 and 13 Committee.**—J. C. Hamilton, San Jose, chairman; S. F. Butler, Salinas; F. W. C. Butow, San Bruno; J. I. Dixon, Santa Clara; Walter Scott, Burlingame.

**N. E. Code Arts. 5, 6 and 7 Committee.**—H. N. Beecher, Los Angeles, chairman; J. H. Crannell, Glendale; Edw. F. Henzel, San Francisco; Fred Vore, Pasadena.

**N. E. Code Arts. 9 and 19 Committee.**—R. H. Manahan, Los Angeles, chairman; R. Edwards, Santa Barbara; J. M. Evans, Los Angeles; C. E. Jenkins, Alhambra.

**N. E. Code Arts. 10, 30, 31 and 50 Committee.**—C. E. Hardy, Oakland, chairman; G. E. Kimball, San Francisco.

**N. E. Code Arts. 11, 16, 17 and 32 Committee.**—H. W. Stitt, Fresno, chairman; C. R. Meikel, Bakersfield; R. P. Rothgeb, Modesto.

**N. E. Code Arts. 14, 15 and 38 Committee.**—C. W. Beaton, Sacramento, chairman; F. C. Colville, San Leandro; E. C. Gerry, Monterey; C. L. Heney, Eureka; F. A. Morrell, Stockton.

**N. E. Code Arts. 18, 33 and 40 Committee.**—A. E. Johnstone, San Diego, chairman; C. D. Felger, Colton; R. H. McKibbin, El Centro; J. W. Munn, Glendale.

**N. E. Code Arts. 34, 35, 36 and 39 Committee.**—J. M. Evans, Los Angeles, chairman; D. E. Graham, Burbank; H. A. Johnson, Ventura; J. McConahey, Los Angeles.

**N. E. Code Arts. 37 and 60 Committee.**—R. W. Wiley, San Francisco, chairman; A. V. Youens, Palo Alto.

Lee C. Baltzelle of the Farley Electric Company of Fullerton, and H. W. Barnes of Barnes Brothers, Pasadena, gave the first estimating lesson of the Electragist course at Santa Barbara recently, going from there to San Luis Obispo where they met the members of the Coast Electric Service Club. The club was holding its regular monthly meeting at Morro Bay on that occasion, and held its meeting following a dinner in a completely electrified cafe, which has about 25-kw. of installed load. The meeting was well attended and the estimating lesson given an enthusiastic reception.

Eugene Pineau, of the Pineau Electric Company, Los Angeles, is manufacturing electric fountains under the name of the Portable Electric Fountain Company. He has just established a fine display room on South Union Avenue, Los Angeles.

J. C. Holland has opened a very fine electric and radio shop at 5632 Pasadena Avenue, Los Angeles. This is across the street from his former location.

D. S. McMillan of McMillan's Electric Shop, Santa Paula, Calif., was in Los Angeles on business recently.

O. N. Robertson of the Robertson Electric Company, Santa Ana, spent a day on business in Los Angeles.

L. D. Spence of the Colton Electric Shop, Colton, Calif., was a recent business visitor to Los Angeles.

Ernest McCleary, past chairman and executive committeeman, Great Lakes Division of the A.E.I., and well known electrical contractor in Detroit, member of the firm of McCleary-Harmon Company, was a visitor in Denver to the home of E. C. Headrick, prominent Electragist of that city, on his way home from a trip to the Coast. Mr. McCleary was accompanied by his wife on his tour taking in San Francisco on his visit.

Gus Gramcko of the Washington Park Electric Company, Denver, has moved from 1207 East Alameda to larger quarters at 1048 South Gaylord Street.

The Coronado Electric Company, which formerly occupied a part of the Coronado Radio Store, at 1007 Orange Street, has moved into new and more spacious quarters of its own at 1146 Orange Street, Coronado, Calif.

R. W. Abright, city electrician of Long Beach, Calif., for the past four years, has resigned to become affiliated with the J. W. Lane Electric Company, electragist of that city.

## Meetings

### Meeting on Farm Electrification Held at Caldwell, Idaho

A convention of various interests concerning the subject of the use of electricity on farms in Idaho, was held at Caldwell, Idaho, recently. The principal subject under discussion was "The Relationship of Electrical Energy to Agriculture."

R. E. Shepherd, of Jerome, Idaho, president of the state Chamber of Commerce, was chairman, and in his remarks pointed out some of the activities of government projects in providing increased use of electricity on the farms of the state.

Dean E. J. Iddings, of the department of agriculture of the state university, told of the electrical development on the farms in eastern Idaho and particularly in the vicinity of Idaho Falls, making the statement that there is greater use of electricity in farm houses in Bonneville and neighboring counties than in any other section of the state and that the use is more varied. He recommended a study of conditions in that part of the state. He also stated that the state experimental farm near Caldwell is to be completely electrified.

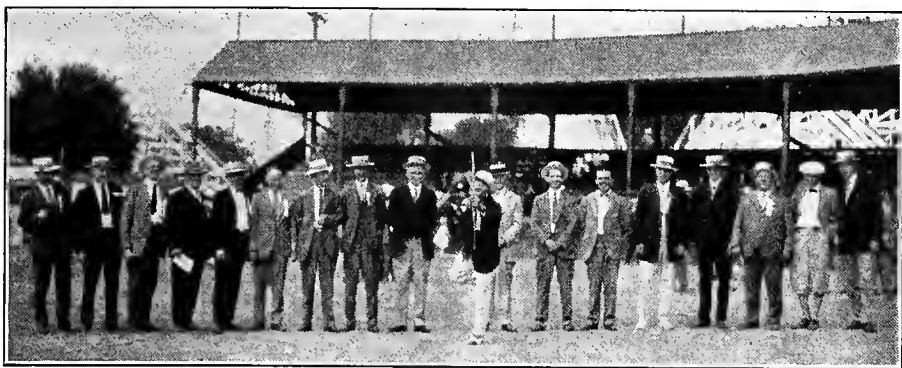
A large number of people, representing various interests, were in attendance at the convention.

### Salt Lake Electrical Fraternity Holds Annual Outing

With a record attendance the annual outing of the electrical fraternity of Salt Lake City and adjacent territory recently was held at Geneva, Utah, a summer resort on Utah Lake, about 40 miles south of Salt Lake City. The outing was sponsored by the Rocky Mountain Electrical Co-operative League and was by far the most successful in the league's history.

Athletic events, in which electrical appliances were offered as prizes, featured the afternoon program. In the evening dancing was enjoyed. Practically all electrical concerns in Salt Lake City declared a half-holiday for the event, with the result that their employees and their families attended in large numbers and the "get-acquainted" spirit prevailed to a much greater extent than on similar occasions in the past.

The committee in charge of the affair consisted of W. A. Moser, of the Westinghouse Electric & Manufacturing Company, chairman; B. C. J. Wheatlake, of the General Electric Company; R. M. Bleak, P. P. Ashworth and M. L. Cummings, Jr., of the Utah Power & Light Company.



Some of the advisory board members of the Electrical League of Colorado lining up for a special stunt at the league's sixth annual picnic held recently in Denver. Left to right: E. P. Kipp, Fred E. Staible, W. R. Kaffer, D. D. Sturgeon, E. C. Headrick, E. A. Scott, W. A. J. Guscott, J. W. Ryall, B. C. Watts, A. C. Cornell (representing Cupid), chairman; J. J. Cooper, V. N. Garretson, B. J. Rowan, Clarence Keeler, F. F. McCammon, O. L. Mackell, C. S. Newell and Charles Addie.

### Colorado League's Sixth Annual Picnic Is Happy Affair

One of the best frolics staged by the local electrical fraternity in the opinion of many who attended, was the recent sixth annual picnic of the Electrical League of Colorado, Denver.

A varied program had been prepared, and there was something happening all the time. There were foot races for big and little, a shaving race for the girls and a bean scramble for the boys, penny-pitching and tomato-

man, and Messrs. Addie, Adler, Bacon, Cargo, Foley, Garretson, Hancock, Mackell, Meriwether, McRoberts, Vaughan, Vosmer and Willoughby. Tickets—J. W. Ryall, chairman, and Messrs. Beck, Byrne, Easton, Fishburn, Gentry, Guscott, Rowan, Staible and Watts. Dance—K. L. Francis, chairman, and Messrs. Cornell, Elliott, Rubincam and Woolley. Gate—Dean Clark, chairman, and Messrs. Acers, Douden, Graveline and Rosenfield. Reception—A. C. Cornell, chairman, and Messrs. Scott, Semrad and McCammon.

### COMING EVENTS

#### California Electragists—

Annual State-wide Meeting—Hotel Del Monte  
Del Monte, Calif.  
Oct. 1-3, 1926

#### Engineering Section, N.E.L.A.—

First Group Meeting,  
Edgewater Beach Hotel, Chicago  
Oct. 13-15, 1926

#### Northwest Association of Electrical Inspectors—

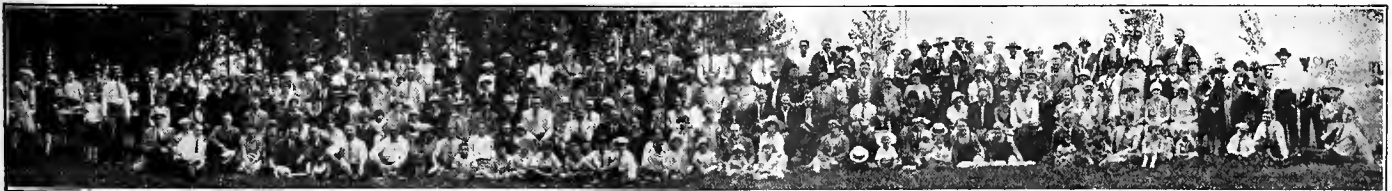
Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 18-19, 1927

eating contests, ankle and secret time races, dancing. Two special events were the penny-pitching contest for advisory board members in which D. D. Sturgeon won the prize, and the baseball game. A feature of much importance was the drawing for forty-four prizes, in which Miss Ellen M. Cornell, daughter of A. C. Cornell, chairman of the league, became the proud possessor of an Automatic washing machine.

Arrangements were in the hands of the following committees: prizes—Clarence Keeler, chairman, and Messrs. Cooper, Davidson, Headrick, Hodgson, Lawrence, Moore, Sturgeon and Walker. Sports—W. R. Kaffer, chair-

**S.E.D. Electric Refrigeration Advertising Committee Meets.**—At a recent meeting of the electric refrigeration advertising committee of The Society for Electrical Development that has charge of the co-operative market development program careful consideration was given to the various details of the co-operative program now being carried forward on behalf of six member companies, the Delco Light Company, Kelvinator Corporation, Nizer Corporation, Servel Corporation, General Electric Company and Copeland Products, Inc. The committee also took action on recommendations for the next year's program which will be presented for the approval of the electric refrigeration executive committee at the conference scheduled to be held at Waldenwoods, Mich., Sept. 10-12.

**Puget Sound Company's Southwestern District Employees Hold Annual Picnic.**—The southwestern district of the Puget Sound Power & Light Company in Washington held its annual picnic at Spanaway Park recently with an attendance of 2,500. The features of the day were sports of all kinds, including two ball games, speeches by means of a loud speaker by R. T. Sullivan, district manager, W. H. McGrath, vice-president, and G. O. Snider. Mr. McGrath announced a plan for group insurance and pensions for all employees of the company.



The big electrical family of Salt Lake City and surrounding territory held the annual gathering of the clan at Geneva on Utah Lake this year. The outing was sponsored by the Rocky Mountain Electrical Co-operative League and, judging by the crowd, nobody stayed home.

## Personals

**D. C. Green**, for more than two years vice-president and general manager of the Utah Power & Light Company, Salt Lake City, is the new president of the Northwest Electric Light and Power Association. By reason of his long experience in executive positions in the utility field Mr. Green is well qualified to discharge the additional duties incident to this position. After his graduation from Purdue University



D. C. GREEN

in 1908 he went to San Diego to enter the employ of the San Diego Consolidated Gas & Electric Company. Shortly afterward he was made manager of the Oregon Power Company and the Everett Gas Company of Everett, Wash. Early in 1915 he went to Salt Lake City as manager of the Utah Power & Light Company's Salt Lake division. In the fall of 1916 he left there, and until again becoming associated with that company in his present capacity was affiliated with various utilities in executive positions, having been vice-president and general manager of the Fort Smith Light & Traction Company of Arkansas just prior to returning to Salt Lake City. Mr. Green has taken an active part in the affairs of the electrical industry in the Northwest and a busy year for the association is expected under his administration.

**D. L. Scott**, manager of public relations for the Los Angeles Gas & Electric Corporation, acted as master of ceremonies at a luncheon at Pasadena during the Pacific Coast Gas Association convention. **Don C. Ray**, manager of public relations for the Pacific Gas and Electric Company, San Francisco, won a three-minute speaking contest held at the luncheon.

**R. B. Wallbridge**, manager of the Porterville office of the Southern California Edison Company for the past seven years, has been transferred to Santa Barbara to take charge of the company's office there.

**S. Waldo Coleman**, president, Coast Counties Gas & Electric Company, Santa Cruz, Calif., and president, Pacific Coast Electrical Association, has returned from a six weeks' trip to the Hawaiian Islands.

**W. D. Brill**, who for some time past has been traveling salesman for the Electric Appliance Company, San Francisco, in Contra Costa and Alameda Counties, recently departed on a three weeks' trip to Pittsburgh and other Eastern points.

**Albert Meinema**, who recently severed his connection with the Electric Appliance Company after an association of sixteen or seventeen years, has returned to San Francisco from an extensive Eastern trip.

**Frank A. Leach, Jr.**, first vice-president and general manager, Pacific Gas and Electric Company, San Francisco, recently left for Quebec to attend the meeting of the Association of Edison Illuminating Companies to be held Sept. 27-Oct. 1.

**H. J. Zweifel**, formerly credit manager for the Electric Appliance Company of San Francisco, is now office manager for the McGraw-Hill Company of California.

**C. E. Patterson** of Bridgeport, Conn., vice-president of the General Electric Company, in charge of the merchandising department, and **W. H. Coleman**, manager of the merchandising department, central zone, with headquarters in Chicago, paid a brief visit to Denver the latter part of August.

**Charles W. Munchow**, formerly associated with the Delco Light Company, Denver branch, has been appointed field representative of the Electrical League of Colorado, effective Sept. 1. Mr. Munchow is 36 years of age, and because of his wide acquaintance with architects and builders in the community it is believed that he will adapt himself quickly to league work and be in position to assist effectively in carrying out the constructive program outlined for the fall and winter months.

**Frank Pergler**, mechanical engineer of Prague, Czechoslovak Republic, who has been sent to this country by that city to inspect all types of engineering works, spent some time in San Francisco not long ago. Mr. Pergler had visited a number of the big power plants in the city and was about to inspect the city's Hetch Hetchy project. He was enroute to the A.I.E.E. meeting in Salt Lake City.

**C. L. Buratti**, of Johns-Manville, Inc., of California, Los Angeles, and a member of the Electric Club of that city, was a guest at a meeting of the San Francisco Electrical Development League not long ago.

**Glenn B. Walker**, superintendent of power sales, Utah Power & Light Company, Salt Lake City, recently returned from a six weeks' trip to Mansfield, Detroit, Cleveland, Pittsburgh, New York, Schenectady, Chicago and Denver. Mr. Walker has been making a study of industrial heating equipment and appliances as used in Eastern cities.

**George A. Kumler**, formerly with the Electric Maid Shop, Portland, has been placed in charge of the Whirldry washing machine department of the Fobes Supply Company and will divide his time between its Portland and Seattle branches.

**Frank P. Withers**, formerly service engineer for the Line Material Company of South Milwaukee, Wis., has become associated with the Illinois Electric Porcelain Company of Macomb, Ill., in the capacity of electrical engineer and in charge of the Chicago district office.

**James F. Fogarty**, vice-president, The North American Company, holding company for the Great Western Power Company of California, San Francisco, and the San Joaquin Light & Power Corporation, Fresno, Calif., recently visited both those cities.

**Cummings C. Chesney**, president, American Institute of Electrical Engineers, accompanied by **F. W. Peek, Jr.**, after attending the Pacific Coast convention at Salt Lake City, have been making a tour of the Pacific Coast.

**H. D. Tisdale**, who sang two bass solos, and **W. A. Linsdell**, who accompanied him on the piano, added much to the program at a recent meeting of the Los Angeles Electric Club. Both are connected with the Southern California Edison Company.

**Ladner V. Ross** has accepted the position of illumination engineer with The Washington Water Power Company, Spokane. He was formerly with The Curtis Lighting, Inc., in Chicago.

**Walter D. Koch**, New York and Boston specialty man for the Graybar Electric Company, recently spent some time in Denver assisting in the washing-machine campaign being conducted by the Public Service Company.

**G. H. Froebel**, formerly manager of the marine sales department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, has been made central station sales manager with headquarters in that city. After leaving the University of Texas in 1909 he entered the employ of the San Antonio Gas & Electric Company and the San Antonio Traction Company, where he remained until 1912 when he left to work on the gathering of engineering data. Later in that year he joined the Westinghouse apprentice course, after which he was transferred to the company's office at Dallas, Texas, as salesman of industrial apparatus. Two years later he opened the Houston branch office as manager of the industrial division for the entire district, where he remained until 1918. Then he enlisted in the army, became a lieutenant in the construction division, and after the war went back to the Westinghouse company. He was made manager of the Houston branch office in 1919, and elevated to the managership of the marine sales department in 1923. Mr. Froebel recently visited the Pacific Coast in connection with a national tour made for the purpose of studying sales conditions in the electrical industry.



G. H. FROEBEL



C. E. Magnusson, dean of the college of engineering, University of Washington, Seattle, has been appointed chairman of the student branches committee, A.I.E.E.

W. A. Knost, of the Illinois Electric Company, Los Angeles, served as a delegate from the Hollywood Post of the American Legion to the state convention recently held in Susanville, Calif.

Frank Ritz, formerly in charge of electric floor polisher salesmen for the B. C. Electric Railway Company, Ltd., Vancouver, has resigned to join the staff of the Northern Electric Company. He has been succeeded by J. W. Philips.

Henry Bostwick, of the Pacific Gas and Electric Company, San Francisco, and president of the Rotary Club in that city, was chairman of the day at the last meeting in August of the San Francisco Electrical Development League. Mr. Bostwick recently attended the Pacific Coast Gas Association convention in Pasadena and from there went to Los Angeles to be present at a meeting of the Rotary Club of that city.

W. Findlay, veteran electric range salesman for the B. C. Electric Railway Company, Ltd., Vancouver, has resigned to take up fruit growing at Vancouver Island near Victoria. Mr. Findlay had been connected with the B. C. Electric Railway Company, Ltd., for eighteen years and upon his retirement was presented with a gold watch chain as a mark of esteem.

H. N. Gooddell, district representative of the Graybar Electric Company with headquarters in Kansas City, recently covered the Denver and Salt Lake territories in the interest of the company.

George Bakewell, Jr., who has been acting as representative of the Electrical League of Colorado, with headquarters in Denver, since the death of S. W. Bishop, has been appointed executive manager of that organization. Mr. Bakewell is a native of Illinois and received his education in St. Louis, Mo. Upon his discharge from the army he



GEORGE BAKEWELL, JR.

entered the employ of the Emerson Electric Company in that city, but in 1920 removed to Denver and entered the newspaper field. In 1922 he became associated with one of the local advertising agencies and continued in that activity until his appointment in August, 1924, as league field representative, the position which he held at the time of the passing of Mr. Bishop.

H. H. Henline, associate professor of electrical engineering at Stanford University, Palo Alto, Calif., a short time ago was among the guests entertained by the San Francisco Electrical Development League at one of its regular meetings.

F. L. Easton, district manager of the Economy Fuse & Manufacturing Company, with headquarters at Denver, was a Salt Lake City visitor recently.

V. H. Griesser, chief engineer of The Washington Water Power Company, Spokane, delivered an illustrated lecture on the engineering features of the Chelan power project in central Washington before the Lions Club in that city a short time ago.

A. J. Schulthess, formerly superintendent of properties of the Spokane United Railways, has been made general superintendent of the company and manager of Natatorium Park. Mr. Schulthess succeeds the late R. A. Willson, assistant general manager, as operating head of the street railways in Spokane. The Spokane United Railways is controlled by The Washington Water Power Company.

Robert Miller, district representative of the General Electric Company, Denver, and member of the advisory board of the Electrical League of Colorado, recently returned to that city from a trip through Montana in the interests of the company. B. J. Rowan, Mr. Miller's assistant, recently made a trip to Pittsfield, Mass.

J. M. Lewis, president, Consolidated Lamp & Glass Company, Coraopolis, Pa., lately paid a visit to the Pacific Coast.

M. H. Herring, sales manager of the electrical publications of the McGraw-Hill Publishing Company, Inc., New York City, spent some time in San Francisco a short time ago. Mr. Herring has been making a tour through the Northwest and the Pacific Coast for the purpose of familiarizing himself with conditions in those sections.

Paul A. Dietz, of the miniature and automobile lamp department of the Edison Lamp Works, of Harrison, N. J., spent two weeks in Salt Lake City territory during August.

E. P. Kipp, western sales manager of the Hazard Manufacturing Company, Denver, is on an extended business trip over his territory. Mr. Kipp spent some time on the western coast and will include Salt Lake City in his itinerary before his return to Denver.

John J. Cooper, president of the Mountain Electric Company, Denver, attended the Glenwood Springs convention and served as chairman of the entertainment committee.

Glen Dunbar, who was electrical designing engineer on the Cushman power project developed by the city of Tacoma, has gone to Aberdeen, Wash., to take charge of all electrical construction for the proposed Wynooche water and power project which the city of Aberdeen will develop.

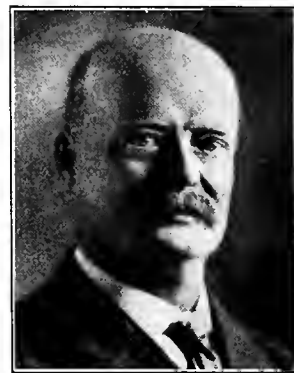
J. L. Kline, of the Western Light & Fixture Company, and L. E. Clark, of the Reiman Wholesale Electric Company, not long ago returned to Los Angeles from a trip to Alaska.

Orville Willoughby and J. H. McRoberts of the Wesco Company, Inc., Denver, are the president and vice-president, respectively, of the newly formed Mono Sales Company, Denver, distributors for the Ryan Aircraft Company of San Diego.

F. L. Hutchinson, national secretary, A.I.E.E., recently spent some time in San Diego and Los Angeles enroute to the organization's convention in Salt Lake City.

## Obituary

Russell A. Willson, assistant general manager of the Spokane United Railways, died in that city Aug. 19. Con-



RUSSELL A. WILLSON

nected with the electrical industry of Spokane since 1905, including fifteen years with The Washington Water Power Company, Mr. Willson was a pioneer in the electrical business of the Pacific Northwest. He operated the first light and power plant in Ishpeming, Mich., in 1882, and constructed and operated the first light and power plant in Marquette, Mich., in 1895. He had been general manager of the light and power, gas and street railways in Helena, Mont., for seven years when he joined The Washington Water Power Company in 1905 as assistant to the general manager. He held that position until 1908 when he was made head of the street railway department of that company, the position he held until 1922 when the Spokane United Railways was formed and he was made assistant general manager. Mr. Willson invented the Hotpoint ovenette, a signal and train stop for electric interurbans, an insulator support used by The Washington Water Power Company, a novel design of street car trucks, a sliding door arrangement for street cars and scores of other ideas for the street railway, light and power and other business.

H. T. Mitchell, Pacific Coast representative of the Consolidated Lamp & Glass Company and the Reliance Metal Spinning Company, with headquarters in Los Angeles, died recently.

Stephen T. Snow, purchasing agent, Graham-Reynolds (formerly Holabird-Reynolds) Electric Company, Los Angeles, died in that city Aug. 27. He had been connected with that concern for about twenty-two years. He was a native of Oakland, Calif.

Henry C. Claussen, partner in the firm of Claussen Brothers Electrical Works, Denver, died in that city Aug. 10.

## TRADE NOTES

The Standard Electric Stove Company, Toledo, Ohio, has issued Catalog 15 showing its complete line of electric ranges, with itemized description of each model. In the foreword under "Facts and Figures" the design, construction, efficiency and special features of the Standard ranges are discussed. The last part of the book is devoted to heavy-duty ovens, toasters, broilers, griddles, hotplates, ovens and plate warmers, fireless cookers, serving tables, water heaters, coffee urns and urn heaters, accessories and repair parts.

L. E. Kincaid, 33 Twenty-ninth Street, San Francisco, has been appointed distributing agent for the Walker dishwasher in the northern California territory. The dishwasher has been on display in the Building Materials Exhibit in the Monadnock Building, San Francisco, and Mr. Kincaid has made arrangements for its distribution through dealers in a number of localities.

The B. K. Sweeney Electrical Company, Denver, has entered the jobbing field after twenty-five years of service as manufacturers' representatives, and has discontinued acting as agents for all manufacturers with the exception of the Ansonia Electrical Company, Weston Electrical Instrument Company, and New York Insulated Wire Company.

Robbins & Myers, Springfield, Ohio, have circulated an attractive broadside, "Sale Finders and Sale Makers for 1926," in which its outlines display and sales suggestions on electric fans.

The Economy Fuse Company, San Francisco, has removed its offices in that city from the Rialto Building to the Call Building, according to announcement of George T. Bryant, district sales manager.

The Electric Corporation of Los Angeles has acquired the business of the Electric Appliance Company, 809 Mission Street, San Francisco. Plans are under way for changing the company's headquarters to 145 Ninth Street, corner of Minna Street.

The Cutler-Hammer Manufacturing Company of Milwaukee and New York has developed and placed on the market a new device for automatically controlling the acceleration and braking of a.c. motor-driven equipment. It is called the Carpenter automatic control station, and has been applied extensively to cylinder presses, web presses, lithograph presses and other printing equipment, although its field of application extends to numerous types of motor-driven machinery on which it is desirable to control the speed of acceleration and to produce a braking effect. The station is used in connection with the standard types of automatic push-button-operated magnetic controllers which are employed for the control of slip-ring motors, although it can be used also with controllers for squirrel-cage motors.

Electric Sales-Service Company, San Francisco, has issued a small folder descriptive of its air heaters and water heaters. Two types of air heaters are pictured.

Parr Metal Products Corporation, 3519 Forty-first Street, Long Island City, N. Y., announces that its line of steel cabinets for the electrical trade includes almost every type for various electrical devices. It makes cutout boxes, entrance switch boxes, panel-board cabinets, junction boxes, and steel cabinets for enclosing rheostats, fire-alarm apparatus, relays, contactors, controlling devices, and electrical apparatus of similar nature.

The King Company is the new name of the former King Manufacturing Company, Chicago, which announces that the King Company, Los Angeles, has been succeeded by the Western Lighting Company. The King Company recently commenced operations in a new plant at Muscle Shoals, Sheffield, Ala.

Mono Sales Company, Denver, a newly formed organization which is the Colorado distributor for the Ryan Aircraft Company of San Diego, Calif., has as officers Orville Willoughby, president, and J. H. McRoberts, vice-president, both of the Wesco Company, and Ralph J. Hall, secretary and treasurer, who is associated with C. H. Parker & Son.

The Beaver Machine & Tool Company, Inc., Newark, N. J., has placed on the market what promises to be a most popular improvement in attachment plugs. The new feature consists of the cap portion of the standard separable plug being made in the form of an elongated handle. This handle cap gives the user a substantial article to get hold of and facilitates directing the brass blades in the slots. It is especially convenient when one is endeavoring to insert the plug into a lighting fixture with the shades in place. The brass blades are made somewhat longer than standard so the plug will hold in more securely. The long handle is furnished in polished black material and the rim is protected by a nicked steel ring, making the whole piece a very sturdy plug. The intended retail price is 35 cents.

The Chicago Fuse Manufacturing Company, Chicago, has brought out new large 4-in. switch and receptacle boxes in both the Gem Lockite and Gem bracket types. These larger boxes provide greater amount of wiring space and because of this are used also for wall bracket outlets. The Gem 4-in. Lockite has the same steel supporting bars as the standard Gem Lockite boxes for quick secure mounting, is provided with knockouts for loom, sheathed cable, flexible and rigid conduit and has provision for fixture stud in bottom. These boxes may be installed either perpendicular or horizontal. Catalog NT boxes are provided with new wide clamps. Gem 4-in. bracket boxes are similar. The bracket attachment makes installation easy and quick, no mounting bars being required.

Arthur E. Bacon, manufacturers' representative, has moved from the Patterson Building to the Radium Building, 1429 Eighteenth Street, Denver.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued leaflet No. 20,288 describing special distribution transformers for electrically operated shovels.

The Ludlum Steel Company, Watervliet, N. Y., has announced that the second edition of its Tool Steel Hand Book is just off the press. It describes in detail carbon, alloy, rust and heat-resisting steels, their use, methods of treating, etc.

The Electro-Kold Corporation, Spokane, has announced that the Scott Buttner Electric Company, 19 Grand Avenue, Oakland, Calif., will act as its East Bay distributors of Electro-Kold refrigerators. The company recently issued a circular describing its new steel-constructed boxes with all-porcelain finish.



"All wet" or not "all wet"? It certainly looks all wet but the 200 folks more or less who took part protest that as a party it was very far from being "all wet," and also that it was entirely "dry." Be that as it may, the annual swimming party of Chapter 10 of the Doherty fraternity at Boulder, Colo., was voted one of the most successful "get-togethers" in the history of the branch. Of the 350, including employees of the Public Service Company of Colorado at Boulder and their families, and a delegation of 20 from Denver, that attended, more than 200 immersed themselves in the Hygienic Pool where the party was held. There were swimmin' races 'n' everythin', and many were the candidates for the laurels of Duke Kahanamoku and Gertrude Ederle. And as for aspirants to the ranks of a certain well known bevy of bathing beauties—well, take a look at the picture.

# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

SAN FRANCISCO  
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## The Frigidaire Sales Franchise means an *ever widening* *extension of Service* to Public Utility Companies

**M**ORE than 250,000 Frigidaire electric refrigerators are now increasing the profits of Public Utility companies.

In the commercial field alone there are more than 10,000 Frigidaires.

And the growing need for lower operating costs is rapidly directing the attention of thousands of merchants, who are now using ice, to Frigidaire—is making every commercial user of refrigeration a Frigidaire prospect.

This ever growing interest in Frigidaire means that the Public Utility Company, holding the Frigidaire franchise, will continue to experience a steadily increasing demand for Frigidaire commercial units and, consequently, a highly satisfactory outlet for additional current.

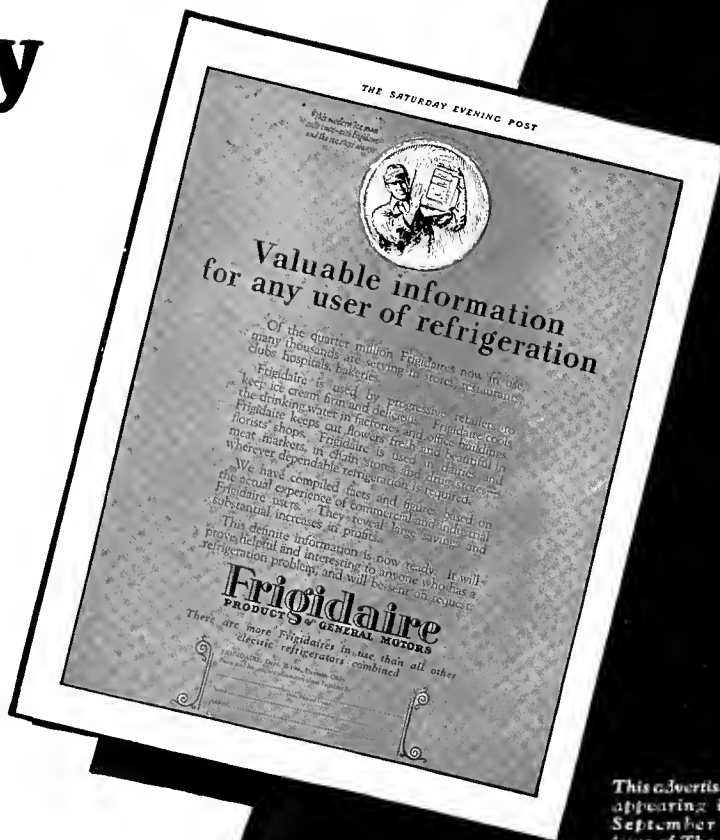
Full details of the immediate possibilities offered Public Utility Companies in the Frigidaire commercial field will be mailed upon request.

FRIGIDAIRE

Dept. N-54, DAYTON, OHIO

# Frigidaire

PRODUCT of GENERAL MOTORS



This advertisement, appearing in the September 25th issue of The Saturday Evening Post, reaches hundreds of thousands of commercial prospects for Frigidaire.



# This End Grain Fibre

## Makes Rockwood Paper Pulleys

### Grip Hardest and Slip Least

#### Forty years ago—

in the early days of power driven machinery, Rockwood conceived the idea of a better belt pulley—a pulley that would transmit more power—a pulley built of paper! By compressing layer upon layer of tough, wear-resisting fibre with the end grain exposed as a surface to grip the belt—Rockwood originated the paper pulley. Its success was immediate. And today that same pulley—constantly improved through the years—is the accepted standard for electric motors and other high grade belted machinery.

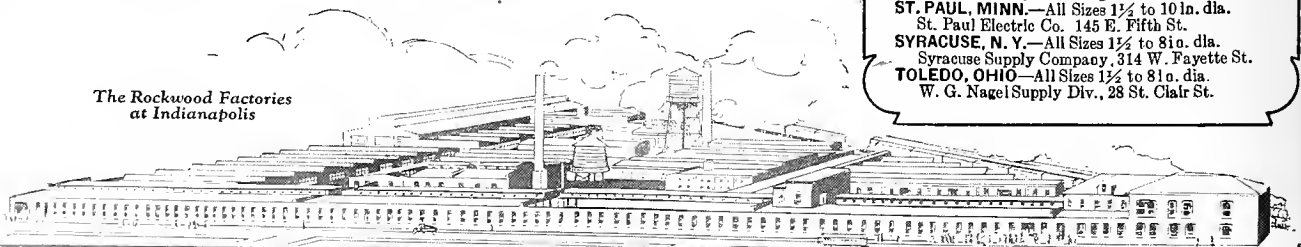
But Rockwood was not satisfied! Innumerable pulley sizes manufactured after receipt of the order and then shipped from the factory necessarily meant slow deliveries. And dealers had to tie up too much money in stock. So 2194 of the more popular sizes in a phenomenal range of 1½ to

14 inch diameters were selected and manufactured in quantities. These 2194 standardized pulley sizes were then mobilized in service stocks from coast to coast, each pulley packed ready for instant demand. Now you, Mr. Dealer, can get immediately from a nearby service stock the Rockwood Paper Pulley of the size required. No waiting for the pulley to be made special after the order is received—no waiting for a factory shipment—no stock to carry—no money tied up—no disappointing your customer.

Rockwood Paper Pulleys and Rockwood service have set a standard unapproached by any other pulley manufacturer. You may telegraph, telephone or write for the Rockwood Paper Pulley called for—and in a few hours at most it will be in your hands. Order from the nearest store listed on this page, giving diameter of pulley wanted, width of belt to be used, size of shaft and dimensions of keyway in shaft.

THE ROCKWOOD MANUFACTURING CO., INDIANAPOLIS, U.S.A.

The Rockwood Factories  
at Indianapolis



## SERVICE STOCKS

### from Coast to Coast

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Sager-Spuck Supply Co., 364-66 Broadway.

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Fulton Supply Co., 70 Nelson St.

**BALTIMORE, MD.**—All Sizes 1½ to 10 in. dia.  
Carey Machinery & Sup. Co., 119 E. Lombard St.

**BIRMINGHAM, ALA.**—All Sizes 1½ to 8 in. dia.  
Matthews Electric Supply Co.

**BOSTON, MASS.**—All Sizes 1½ to 14 in. dia.  
Olmsted-Flint Corp., Cambridge.

**BUFFALO, N. Y.**—All Sizes 1½ to 10 in. dia.  
Root, Neal & Co., 178-180 Main St.

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Chicago Electric Co., 740 W. Van Buren St.

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**INDIANAPOLIS.**—All Sizes 1½ to 14 in. dia.  
Rockwood Paper Pulley Stores, 1801 Englehard.

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Cameron & Barkley Co., 336 E. Bay St.

**KANSAS CITY, MO.**—All Sizes 1½ to 10 in. dia.  
Webb Belting Co., 1501 West Twelfth St.

**LOS ANGELES.**—All Sizes 1½ to 24 in. dia.  
Illinois Electric Co., 313 S. San Pedro St.

**LOUISVILLE, KY.**—All Sizes 1½ to 8 in. dia.  
E. D. Morton & Co., Inc., 516 West Main St.

**MILWAUKEE, WIS.**—All Sizes 1½ to 10 in. dia.  
Julius Andrae & Sons Co., Broadway and Mich.

**NEW ORLEANS.**—All Sizes 1½ to 8 in. dia.  
Woodward, Wight & Company

**NEW YORK CITY.**—All Sizes 1½ to 14 in. dia.  
Rockwood Paper Pulley Stores, 6 Murray St.

**OMAHA, NEB.**—All Sizes 1½ to 8 in. dia.  
Interstate Mch. & Sup. Co., 1006 Douglas St.

**OKLAHOMA CITY, OKLA.**—All Sizes 1½ to 8 in. dia.  
A. W. White, 424 West Reno St.

**PHILADELPHIA, PA.**—All Sizes 1½ to 14 in. dia.  
Charles Bond Company, 617 Arch St.

**PITTSBURGH, PA.**—All Sizes 1½ to 12 in. dia.  
Transmission & Belting Co., 325 Second Ave.

**ROCHESTER, N. Y.**—All Sizes 1½ to 8 in. dia.  
Rochester Electrical Sup. Co., 240 St. Paul St.

**SALT LAKE CITY, UTAH.**—All Sizes 1½ to 8 in. dia.  
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**SEATTLE, WASH.**—All Sizes 1½ to 14 in. dia.  
Seattle Hardware Co., 501 First Ave. South.

**ST. LOUIS, MO.**—All Sizes 1½ to 14 in. dia.  
Teuscher Pulley & Belting Co., 801 N. 2nd St.

**ST. PAUL, MINN.**—All Sizes 1½ to 10 in. dia.  
St. Paul Electric Co., 145 E. Fifth St.

**SYRACUSE, N. Y.**—All Sizes 1½ to 8 in. dia.  
Syracuse Supply Company, 314 W. Fayette St.

**TOLEDO, OHIO.**—All Sizes 1½ to 8 in. dia.  
W. G. Nagel Supply Div., 28 St. Clair St.

# ROCKWOOD *Instant* PULLEY SERVICE



# Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."  
Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

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## Keeping Data for Industry

ONE of a trade journal's prime functions is the collection and compilation of data and statistics with reference to the industry which it serves. In the performance of this function the McGraw-Hill Publications take the lead. Approximately 15,000 sources of information are consulted constantly; 220,000 subscribers constitute a further source and 41 McGraw-Hill men devote their time to the compilation and correlation of this information.

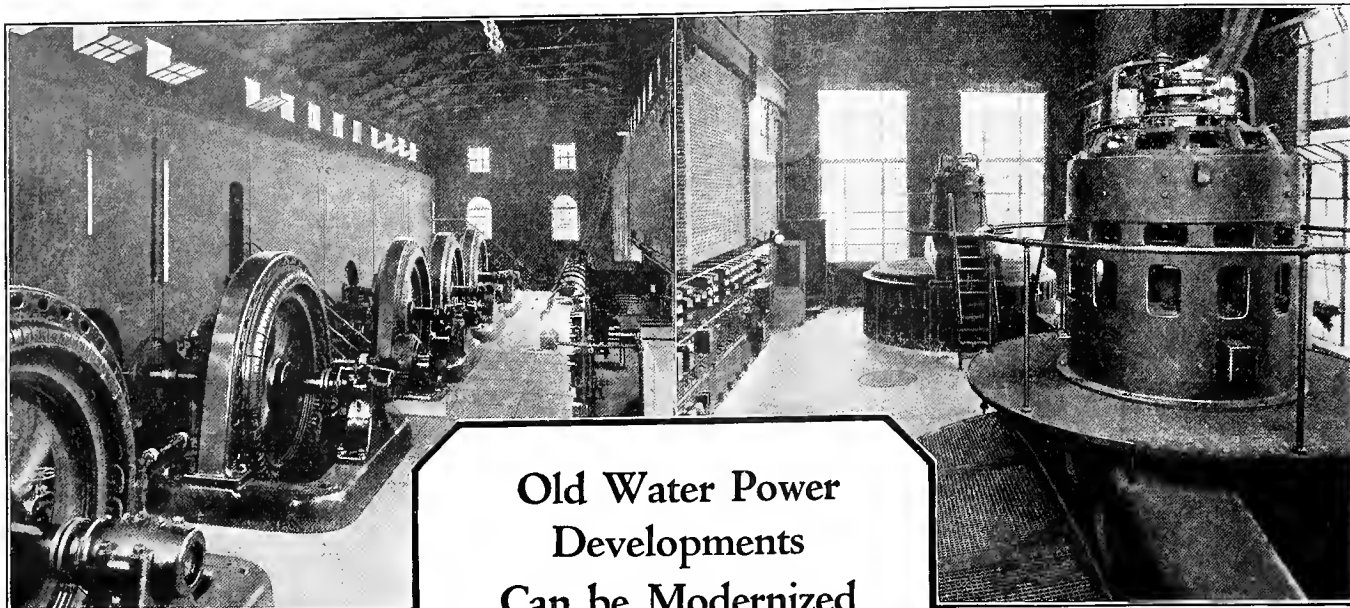
Among the data which are offered annually to its subscribers the Journal of Electricity presents figures on the construction and merchandising programs of the central stations, the growth in production and consumption of kilowatt-hours and the growth in number of central station consumers. It also compiles data dealing with the total merchandise sales of the electrical industry in its territory and the proportion which passes through the various trade channels. This is only one of the many services which are offered readers.

These data, however, are used for another purpose. From this storehouse of information and the experience gained in collecting it the McGraw-Hill Company has perfected a rating of industrial markets and a formula for reaching them efficiently. This knowledge is summed up in the McGraw-Hill Four Principles of Industrial Marketing which are explained more fully in the advertisement on pages 38 and 39 of this issue. Information will gladly be furnished on either these principles or on the data service to anyone who is interested in inquiring.

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Publishers of  
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American Machinist  
Successful Methods  
Electrical World  
Electric Railway Journal  
Engineering and Mining Journal  
Bus Transportation  
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Coal Age  
Radio Retailing  
Power



BEFORE RECONSTRUCTION  
4800 K.W.

Old Water Power  
Developments  
Can be Modernized  
with Profit

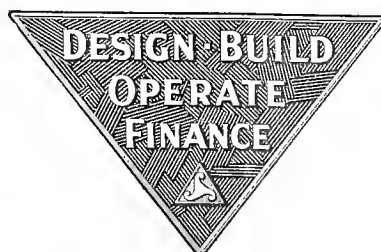
AFTER RECONSTRUCTION  
7200 K.W.

**B**Y redevelopment of existing water power plants, our engineers have assisted the Manchester Traction, Light and Power Company in substantially increasing generating capacities and plant efficiencies. The capacity of one plant was increased from 4800 kw. to 7200 kw. with an increase of 25% in plant efficiency. In another plant the efficiency was increased 50%.

The opportunity to utilize interconnected water power to carry the peak load of steam plants demands that the reconstruction of old water power plants receive the closest study. Our engineers are prepared to assist all such investigations.

# STONE & WEBSTER

INCORPORATED



BOSTON, 147 MILK STREET  
NEW YORK, 120 BROADWAY  
CHICAGO, FIRST NATIONAL BANK BLDG.

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PITTSBURGH, UNION TRUST BLDG.

# EDITORIAL

## Helping the Farmer to Make More Money

UNDER the appealing title, "How to Make More Money on the Farm," the Puget Sound Power & Light Company has prepared a booklet describing the various applications of electricity on the farm for its present and prospective rural customers. The story of what electricity has done for industry in increasing production and decreasing costs is told briefly and clearly with the statement that the proper installation of power and machinery on the farm multiplies man-power, saves money and brings increased prosperity. The major story is told largely in pictures. While conceivably the electrical industry cannot run the farmer's place for him, it can and should show him what electric power and electric machinery will do to lighten his burdens and improve his living conditions. The publication and distribution of this booklet is a step in the right direction.

## Nippon Feels the Public Ownership Urge

JAPAN, leader among oriental nations in the development of its power resources, is beginning to experience the customary public ownership urge which follows the successful pioneering and establishment of going enterprises the world over. After the real work of achievement has been accomplished, and any enterprise may be considered certain of its right to existence, along comes the usual agitation for government operation of that enterprise. Japan is learning this in its electrical industry, even as America has found it these last few years.

In the naive translation of the Japanese language into English, the problem is stated as follows in "Denkinotomo" (the Electrician's Friend), a Japanese trade publication:

The national unification of electric power has recently become an important theme in political circle. Members of Upper and Lower Houses are urgently advocating the creation of investigation committee for this purpose. It is expected that some measure will be introduced in coming Diet. National ownership is looked upon to be very difficult, if not impossible, owing to the vast amount of capitalization. The creation of a big transmission company subsidized by the Government is thought to be more realizable as a first step at least.

Japan might well look upon the experience of European countries with government ownership of utilities before embarking upon such an enterprise, realizing that her present industrial development has been due, as in America, to the play of private initiative allowed those who have established industries.

The spectacle of European nations, writhing in economic death throes, and desperately struggling to recover the status of pre-war currency, throwing off, one at a time, the governmental operation yokes which are throttling them, is a spectacle which Japan or America might well look upon as a terrible lesson. The sight of Germany recovering her economic status, slowly and yet soundly, since she has turned back her devitiating railroads to the sterner discipline and more economic management of private enterprise; the brave struggle of little Belgium to regain its feet by similar means; and the rigid, heroic measures employed by Fascism in Italy along similar lines, that Italy may pay its debts by reducing unnecessary government expenses of all kinds, even to the costs of elections; while France, unwilling to face the facts of an ever increasing governmental burden, is milling about in a chaos which may yet strangle it,—these are spectacles which should serve as horrible examples to a nation enjoying prosperity as a result of private initiative and enterprise.

## A Company Earns a Tribute From its Own Country

THE old saying, "a prophet is not without honor, except in his own country," has been taken as an axiom for so long a time that a new concept is all the more surprising for it. Yet the real measure of a man, or an institution, is what his intimate neighbors think of him. The measure of success of public relations of a power company, surely, is to be found in what the people it serves think of it.

In this respect the commendation and approval of those in the community themselves in a position to appreciate the service rendered is a tribute well worth earning. The Washington Water Power Company finds itself in this happy position within its own community, it was brought out in a recent incident.

At a directors' meeting of a banking organization in Spokane, when the matter of service was mentioned the president gave it as his opinion that his institution could well afford to emulate the wonderful service record made by the power company. He went on to describe some of the special and unusual services that had been extended him as a customer, and when he had finished the other directors are said to have confirmed him in his statements and added their own tributes to those he had made.

Not long ago in these columns the opinion was ventured that there were three kinds of public relations. The first was negative, wherein the com-

pany was receiving complaints. The second was neutral or complacent, where no complaints were being received—a condition which was neither very favorable nor unfavorable, only dangerous. But the last was that state in which customers spontaneously declared themselves in terms complimentary to the company and were anxious to show their appreciation of the service they were receiving.

Clearly the case just mentioned falls into the latter and very much to be desired classification, the category denoting public relations of which a utility may be proud.

#### **A.I.E.E. Holds Notable Convention at Salt Lake**

**A**N unusually good program in which subjects relating to the transmission and control of electrical energy, lightning studies and discussions of engineering education played an important part, featured the Pacific Coast convention of the American Institute of Electrical Engineers just held at Salt Lake City. There were several outstanding contributions to the art and many fine discussions. A happy division of subjects on the program between technical and practical increased the interest in the convention, and set a new standard for meetings of this character. Perhaps the outstanding feature of the convention was the banquet at which Dr. Harris J. Ryan of Stanford University, past president of the Institute, was presented with the Edison Medal by President Chesney. Because of the high esteem in which Dr. Ryan is held by both members of the Institute and by the electrical profession this ceremony was a most impressive one. For those who could not attend the convention and to refresh the memories of those who were present a complete report of the sessions will be found on another page of this issue.

#### **Glenwood Convention Points to Commercial and Sales Problems**

**R**EMARKABLE unanimity of opinion that the central station's sales and commercial programs and policies must be revised and broadened to meet present and anticipated conditions in the industry has been the outstanding development of the various regional meetings of the N.E.L.A. here in the West this year. The Glenwood convention of the Rocky Mountain Division, the last to be held, fell in line with the Los Angeles and Spokane meetings. There, as in the two earlier conventions, the subjects which received major attention related to sales and commercial efforts and to public relations.

Among the defects of the industry's selling structure brought out at the Colorado meeting were the fact that the number of appliances sold is not keeping up with the number of customers added and the fact that the \$125-a-month salesman with a correspondingly low calibered sales manager is not capable of handling the central stations' \$12,000,000 a year sales quota. It was further brought out that the power company's sales efforts must include taking the merchandise to the customer's home in

selling and that merchandising itself is secondary to an increased production and sale of kilowatt-hours.

It is to be sincerely hoped that the facts brought out in the papers and discussions at the important conventions this summer will be taken to heart. With the commercial and public relations problems holding the center of the stage at three meetings it is conceivable that something is radically wrong with the structure or operation of these departments. There will be no correcting of the ailments, however, if those who attended the conventions go home and immediately forget these important problems in the petty cares of their own particular jobs.

#### **Aesthetic Notions and the Moving of Poles**

**I**N the engineering departments of some power companies, life is just one pole moving request after another. Because there is such a thing as a desire to get along with the public, these requests have to be taken seriously. Usually a man has to spend a good part of the day going over the situation, finding the objecting property owner, surveying the situation with respect to relocating the pole, and making his report. Then, if the case is carried through, a line crew spends another part of another day relocating the pole, transferring the leads, services and necessary guys. All told, the job of relocating the pole runs into some considerable expense.

But it is the underground advocate who is the most lavish in his desires to spend someone else's money, for that is what it amounts to in the long run. The cost of moving poles and running services underground must be borne by the entire system, must be considered in rates charged for service. Yet the aesthetic taste of some school principal who thinks a pole or two on the street ruins the view of the new school, the fussy householder who builds a modest mansion without thinking of the pole on the street until the house is finished and looks out at his prize view obstructed by the presence of a creosoted cedar tree trunk—these immediately clamor for underground service.

In the pole moving situation there is the opportunity for more grief, or more expense, or more goodwill than probably any other situation. The company which is "hard boiled" and does not take the time or trouble to be diplomatic is the one which earns the grief. The company which in its anxiety to still public disfavor moves poles at the slightest provocation, is the one getting the unnecessary expense.

But the company which seizes upon each such request as a distinct opportunity to do some proselytizing of good will, and makes the customer understand that the pole can be moved probably, and that if he desires it very greatly he will be willing no doubt to assist in the cost of moving the pole, can accomplish two things. It can bring a realization of that individual that moving poles, or any other such work, costs a great deal, and that if it is



done for nothing, its cost will have to be absorbed in rates.

The second accomplishment will be that the number of such pole movings shall be cut down to a minimum, and yet those objecting to poles as scenery will understand and learn to look the facts as well as the poles in the face without a wry taste or an injured aesthetic air.

### Take the Appliance from the Gift Class

"HOW lovely!", exclaims Mrs. Housewife, as she receives the gift of a beautiful electric percolator set at Christmas, "but it is really too pretty to use."

And so she places it prominently on the dining-room buffet as a new decoration for her home. When spring brings her news that Cousin Esther is about to be married, her concern over what to give as a wedding present ends when her eye chances to fall upon the percolator set. Cousin Esther, now happily married, let us hope, entertains a number of friends at bridge. What shall she give as a prize? Oh, yes, the beautiful percolator set that she has never used and knows she will never want to spoil by using. And so the percolator set again is placed in circulation.

It is not inconceivable that through being shifted thus from one family to another the percolator set may in time be regiven to Mrs. Housewife, who first sent it upon its travels. The percolator set may eventually wear out—but hardly from use as a percolator.

Thus many too beautiful appliances finally wind up, after weary rounds of traveling, in someone's attic or on a closet shelf, never having known the joy of turning a meter.

The trouble with this sort of thing is that it is not only the central station which suffers from the too beautiful appliance that is constantly regarded as a gift and not a thing of usefulness. The manufacturer of the appliance suffers, too, since instead of five or six sales he makes but one sale of an appliance which from that time on frequently is given but seldom if ever used.

A census of the average home would reveal that a large percentage of electrical appliances had reached there as birthday, Christmas, wedding or anniversary gifts or else that somebody had been lucky at bridge. These appliances are to be found either on a shelf in the closet or upon the buffet as dining-room decoration. The old ditty of farm life, "Nice pictures of fruit on the dining-room wall, but no sign of fruit on the table at all," finds a sadly true paraphrase in the situation of electrical appliances in many a home.

While there is no denying the market of appliances as gifts, a market which by all means should be kept alive, there is a place today for the appliance which appeals by its usefulness and its reasonable cost. The public needs to have its point of view changed so that it will regard electrical appliances not as luxuries and gifts but as tools.

When it is possible, through exercise of the

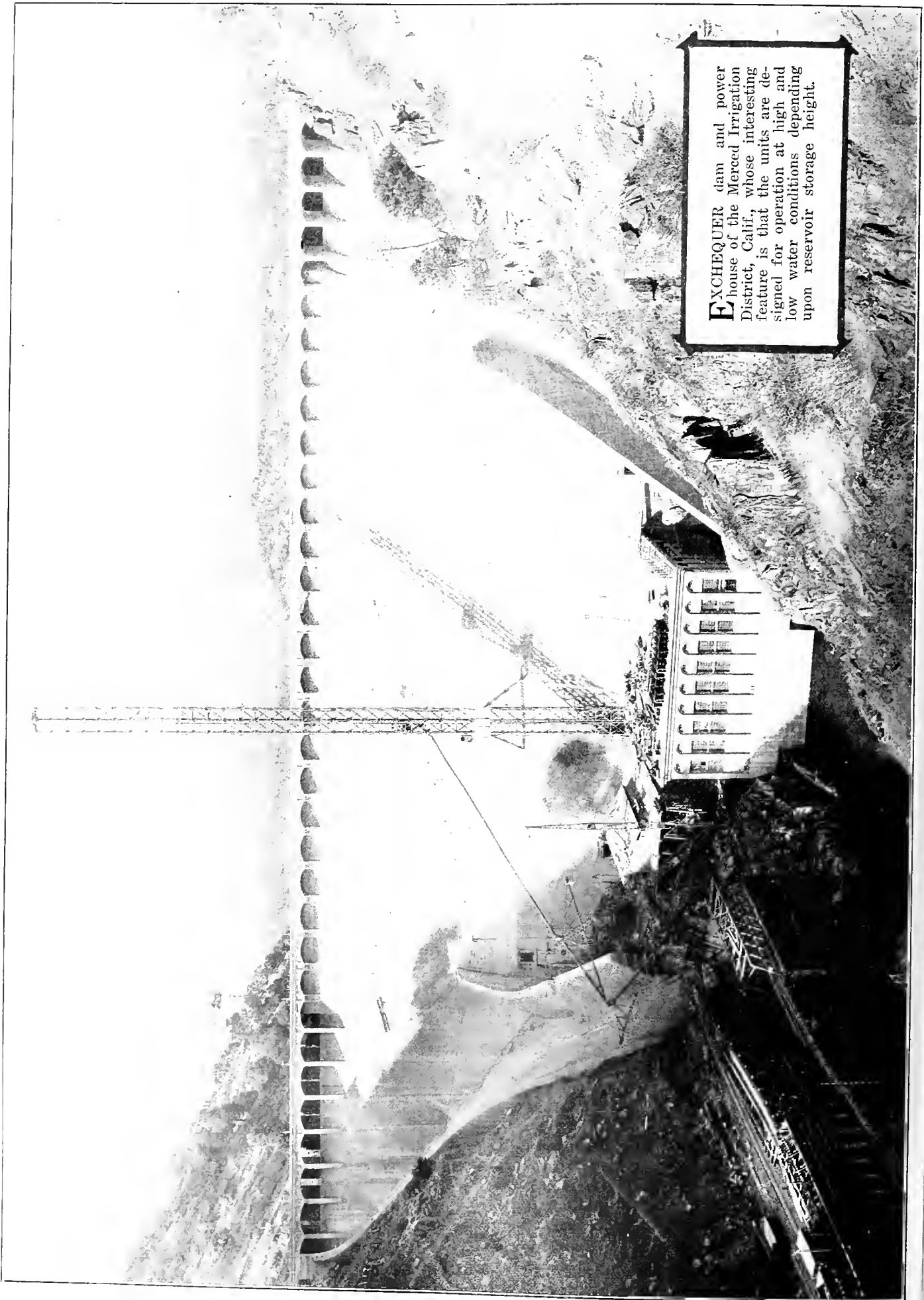
genius of production for which America is famous, for the man of the family to walk into a store selling electrical appliances with a five-dollar bill and come out with the appliance under his arm instead of merely a receipt for the first payment, then the appliance will attain something of the acceptance of the flivver, the gas range, the typewriter, or any of those things which today are regarded as indispensable tools of modern living. In that day the appliance manufacturer, the dealer and the central station each will enjoy greater benefits from every appliance sold.

### Dedication of the New Ryan Laboratory

CALIFORNIA'S precedence in the development of high tension transmission has been more firmly established as the result of the dedication of the Harris J. Ryan Electrical Laboratory at Stanford University on Sept. 17, 1926. With two high-voltage laboratories, with the lines of two utilities operating at 220,000 volts and the line of a third designed to operate at this potential, this state now ranks as the seat of high tension research and application.

The dedication of the Ryan Laboratory marks the culmination of the dream of a man who has played a prominent part in the transmission progress of the industry. To Dr. Harris J. Ryan, who has just been accorded the signal honor of being awarded the Edison Medal for his contribution to the science and art of high tension transmission of power, must go the honor for the establishment of the laboratory. His experiments, first with reference to the relation of temperature to resistance in insulators and later with corona effects, not only had a great bearing upon transmission progress but also brought out the necessity for the laboratory. Negotiations begun in 1921 have borne fruit. Through the co-operation of university officials, power companies, manufacturers and other utilities the dream of five years ago is now an accomplished fact. Ground and building were furnished by the university. The transformers and auxiliary equipment were furnished by the power companies, manufacturers and telephone utility. In addition to the building and equipment provision has been made for a 9-mile test-transmission line.

At the dedicatory exercises Dr. Ryan himself tersely outlined the bearing which the laboratory will have upon the future progress of the electrical industry. Briefly summed up his statements showed that by 1935 all of the water powers within present economic transmission distance of the Western market centers will have been developed. To bring in the immense amounts of power available on the Colorado, Columbia and other Western streams, higher transmission voltages will have to be employed. Before this can be done advances must be made in the technical knowledge of high voltage. Many of the requisite researches to bring about these higher voltages will be conducted in the Ryan Laboratory. Thus the laboratory will be an important link in the chain of Western progress.



# Another Low-Head Plant for California— Exchequer Utilizes Irrigation Waters

By A. A. Blakesley

Chief Engineer, Merced Irrigation District, Merced, Calif.

**E**LECTRICAL energy is a by-product as far as the Exchequer project of the Merced Irrigation District, Calif., is concerned. The project is located on the Merced River some 35 miles northeast of Merced, directly on the main line of the Yosemite Valley Railroad. The prime object considered was the procuring of an adequate supply of water to permit and facilitate the continued agricultural expansion and development of the district. The district comprises 189,682 acres of land in the general vicinity of Merced.

Power equipment was installed solely for the purpose of extracting a maximum revenue from the water as it passes the dam and as long as the water level is high enough to drive the turbo-generators. Under average conditions the reservoir will start to fill in February and will be completely filled by May. This statement is based upon the results of a long-period survey of the river characteristics and upon estimates of normal water consumption by the district. It is contemplated that the plant will operate at full load during about five months of the year and at varying degrees of partial load during a period of about four months. This means that the plant will be completely shut down during some three months of each year. Of course these are estimated average conditions and will vary from season to season depending upon precipitation and other uncontrollable conditions and upon the demand for irrigation water by the district.

A drainage area of 1,076 sq. miles ranging from a minimum elevation of 400 ft. to a maximum of 13,090 ft. supplies the Merced River. The estimated average precipitation over this area is 39 in. per annum which results in run-off conditions as indicated in the hydrographs shown in Fig. 1. River flow varies from a normal minimum of 90 sec.ft. to an average maximum of 6,000 sec.ft. with yearly peaks running as high as 15,000 or 18,000 sec.ft. The maximum recorded within the past 18 years is 37,200 sec.ft. as shown in the chart for January, 1911. The average total annual run-off is 960,000 acre-ft. of which the Exchequer reservoir is capable of storing 289,000 acre-ft. Its average depth is 106 ft., maximum depth 330 ft., its area 2,700 acres and its length 12 miles.

**C**ONSERVATION of flood waters of mountain streams is the keynote of California's continued agricultural development. That electric power can be developed profitably as a by-product in the face of adverse electrical operating conditions is one of the interesting features of the Exchequer project of the Merced Irrigation District.

Demands for irrigation water begin to be felt in April of a normal year and continue through to November, reaching a peak in the month of June. These demands at the present vary from a minimum of 400 sec. ft. to a maximum of 1,300 sec.ft. From this and from the hydrographs may be seen the great advantage of the 289,000 acre-ft. storage provided by the Exchequer dam which holds this amount

of water over from a useless to a useful period.

As mentioned in the first paragraph the hydro-electric plant built in conjunction with the Exchequer dam is merely to extract as much revenue as possible from the passing water. Considering that the project was necessary from an irrigation standpoint the fixed charges placed against the generating plant are small. The total investment in the power house and equipment is approximately \$900,000. Considering a normal return of \$110,000 necessary to carry interest, depreciation, maintenance and operating costs, everything over that amount will be available for assisting the district to meet the costs of its other developments. Considering further that the plant operates the equivalent of seven months at full load with a load factor of 60 per cent and a power factor of 80 per cent the total gross return will be in the nature of \$300,000 annually. Thus the power development is justified from an investment viewpoint under existing conditions in spite of the adverse operating schedule from a power point of view.

Power is wholesaled at the generator switchboard thus relieving the district of any further obligation or responsibility. It is necessary that the power house be operated by the district in order that regulation of water according to district demands be given first consideration.

## Dam

The dam is a gravity structure arched in plan on a radius of 674 ft. It is located at a comparatively narrow point in the valley of the Merced River about 7 miles northeast of Merced Falls. The entire area contiguous to the reservoir is underlaid with volcanic rock that seems to be impervious to moisture. Outcroppings at the damsite influenced the selection of that site for the purpose. Good founda-

tions and anchorages were available without excessive excavation. A transverse section through the dam and power house is shown in Fig. 2.

Foundations extend 27 ft. below the normal bed of the river to El. 376. The base of the dam proper rests at El. 384 and the spill crest at El. 693. Fourteen-foot gates raise the maximum water stor-

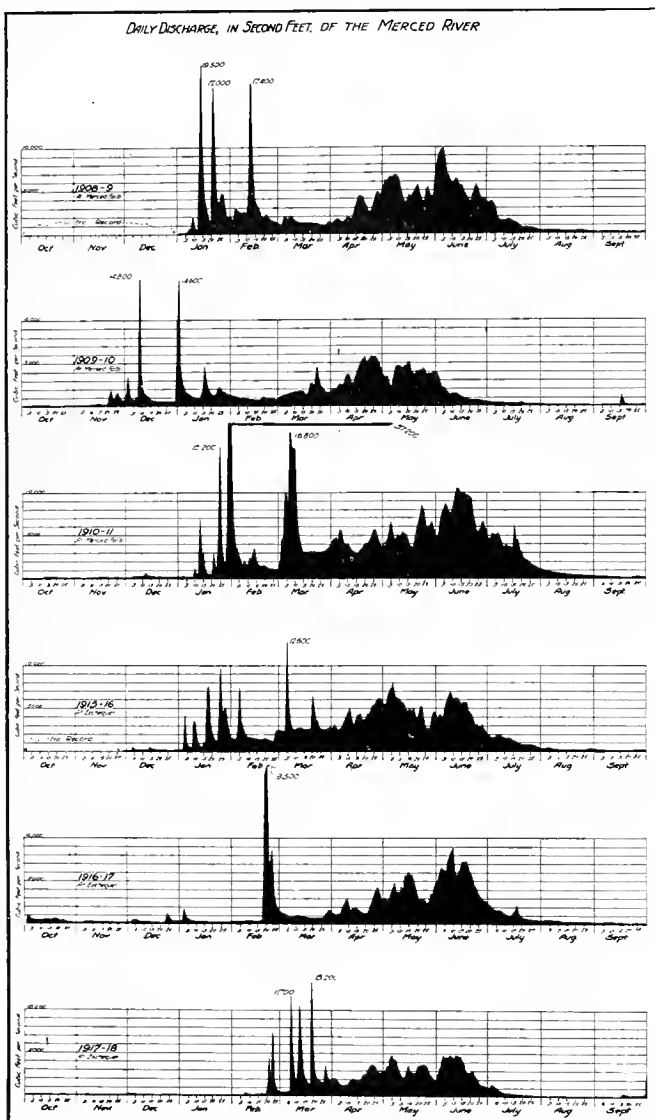


Fig. 1. Hydrographs showing flow characteristics of the Merced River.

age level to El. 707. The roadway across the top of the dam is at El. 710 and the balustrades are 4 ft. high, giving a total apparent height of 330 ft. Thickness at the spill crest is 12 ft. and at the base 220 ft. Clear width of the roadway is 16 ft. and the total width including the balustrades 21.5 ft. Excavation for dam and power house totaled 97,000 cu.yd. and the concrete placed totaled 396,000 cu.yd. Crest length of the dam is 960 ft. and base length 40 ft.

Capacity of the over-pour-type spillway is 75,000 sec.ft., more than twice the greatest flood recorded on the river. It is divided into two sections, one located at each end of the dam. Each section is subdivided into 7 passages each controlled by a butterfly-type gate 3 x 14 x 24 ft. in dimension.

These gates are built up of steel trusses and covered with steel plates. Method of installation and control is indicated in Fig. 3. The gates rotate through an angle of 90 deg. in a horizontal plane. They are actuated by an electrically driven operator mounted on a car. There are two of these operator cars, one for each end of the dam, each fitted so as

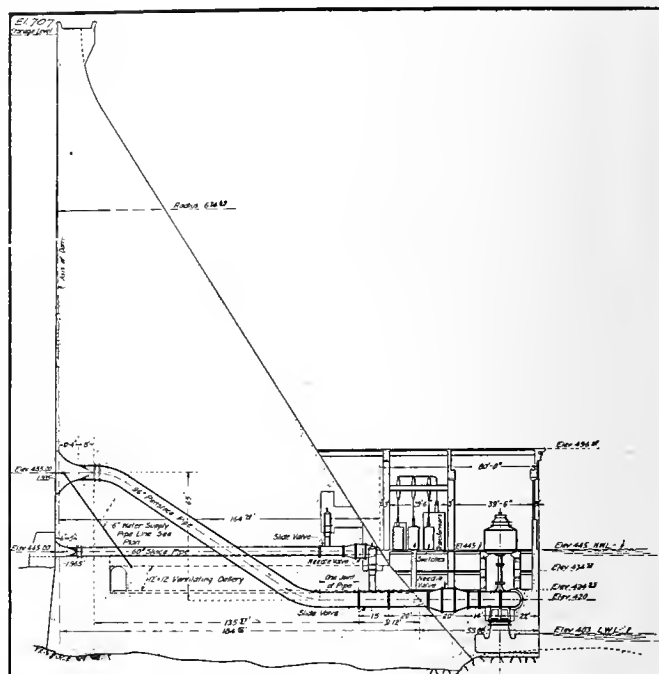


Fig. 2. Section through dam and power house showing relative location of equipment and giving various elevations.

to clamp to the track during the operating period. Outlets are provided at each operating position so that no trolleys nor long flexible conductors are necessary. Each gate weighs 18.8 tons.

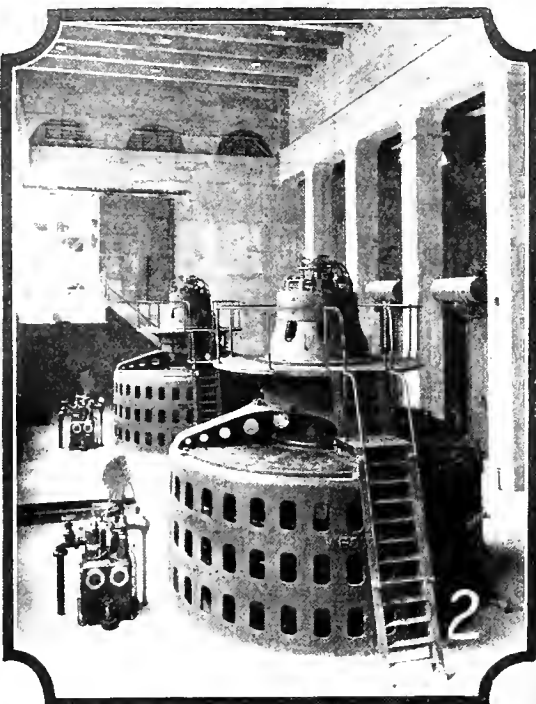
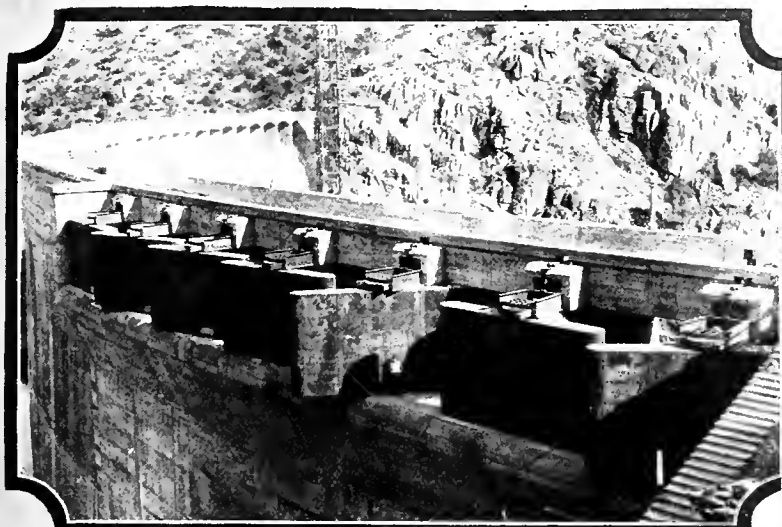
A spillway channel down each end of the dam conducts the spillage to a point beneath and beyond the power house. Inspection galleries extend up through the dam from the level of the turbine floor to the crest at each end of the dam. These contain stairways and also serve as air passages for the power house.

### Construction

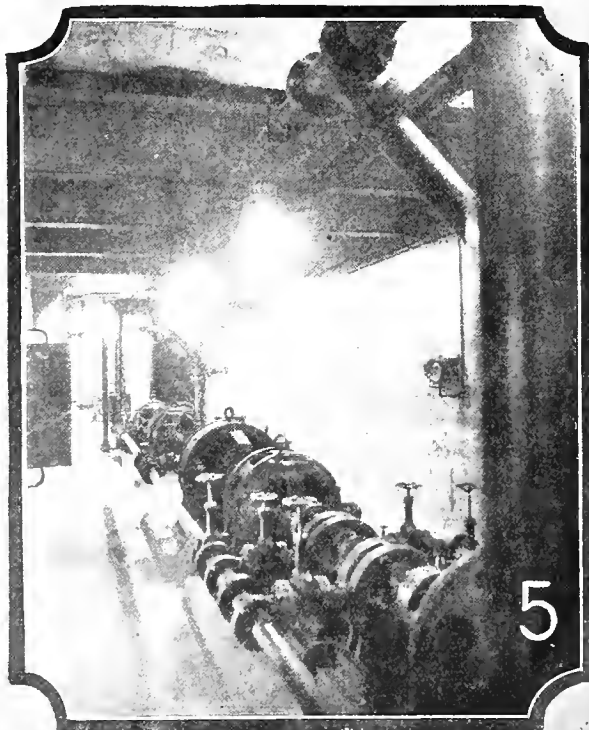
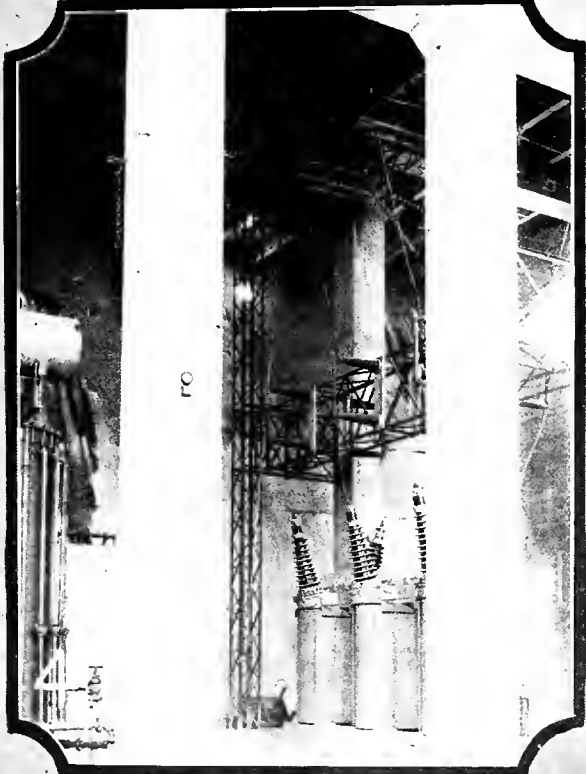
Because the dam is located in a narrow canyon which is also occupied by the Yosemite Valley Railroad, construction involved many difficulties. In addition to extreme space limitation, work had to be carried on without interruption to the operation of the railroad. Thus the dam had literally to be built around the railroad until its track could be relocated. An average of 22 trains per day operated over the line.

Space limitations at the site of the construction plant made the storage of more than one day's supply of aggregate and two days' supply of cement infeasible. Aggregate bunkers were 450 ft. downstream from the mixing plant with the tops of bins level with the railroad tracks. A spur track ran over the bins which were supplied through bottom-dump cars. The mixing plant was immediately adjacent to the 475-ft. double compartment steel tower. Concrete was discharged through chutes





OF particular interest in the Merced Irrigation District's Exchequer plant are: (1) The butterfly spill gates showing their size compared with a man. (2) The generator floor as seen from the switchboard balcony. Two Westinghouse 15,625-kva. units compose the generator equipment. (3) The switchboard. (4) Indoor high tension bus and equipment may be seen here. (5) The oil pressure equipment for the Pelton governors, located in the basement. The power plant is located at the foot of the 330-ft. dam. Two Johnson valves allow the bypassing of irrigation water when storage water elevation is low.



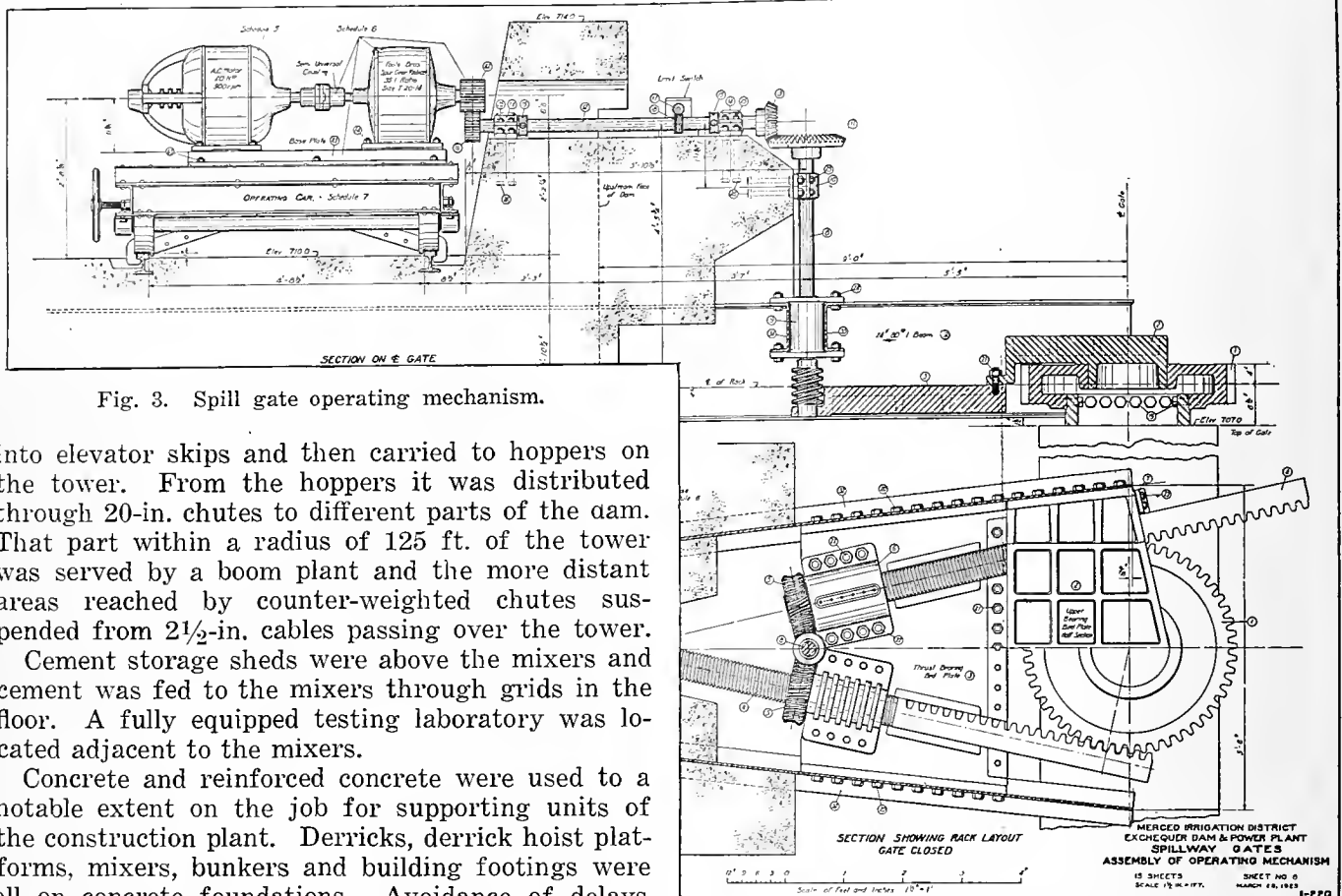


Fig. 3. Spill gate operating mechanism.

into elevator skips and then carried to hoppers on the tower. From the hoppers it was distributed through 20-in. chutes to different parts of the dam. That part within a radius of 125 ft. of the tower was served by a boom plant and the more distant areas reached by counter-weighted chutes suspended from 2½-in. cables passing over the tower.

Cement storage sheds were above the mixers and cement was fed to the mixers through grids in the floor. A fully equipped testing laboratory was located adjacent to the mixers.

Concrete and reinforced concrete were used to a notable extent on the job for supporting units of the construction plant. Derricks, derrick hoist platforms, mixers, bunkers and building footings were all on concrete foundations. Avoidance of delays and other difficulties resulting from settling foundations more than justified the extra cost.

### Hydraulic Equipment

Hydraulic equipment is installed as indicated in Figs. 2 and 4. The main penstocks are 96 in. in diameter, intake at El. 485 and enter the turbine at El. 420. Where the two penstocks emerge from the dam into the power house there is installed a 76 x 96-in. oil-operated sliding gate valve, one in each line. Immediately beyond these gate valves the penstocks split, one line passing straight through to the turbine while the other diverges at an angle of 45 deg. to an axis 16 ft. from that of the main line and thence on through a 96-in. free-discharge Johnson by-pass valve. Between the branch point and the turbine in the main line is installed a 96-in. needle valve for controlling the water to the turbine wickets.

In addition to the penstocks there are two 60-in. sluice pipes intaking at El. 445 and discharging at the same elevation. These protrude through the dam adjacent to the power-house foundations, one at each side. At the discharge end of each is a 60-in. free-discharge Johnson valve. These sluice lines are for the purpose of passing irrigation water when the elevation of the storage water is below level of the penstocks.

All of these valves are motor-operated from control stations located adjacent to the valves themselves.

Turbines are of the Francis type, vertical reaction units, designed for variable heads. Each is rated at 24,500 hp. at 300 ft. operating head. This

figure grades down to approximately 1,475 hp. at 95.5 head, which is considered to be the lowest head warranting operation of the plant. The draft tubes are split so that a section may be removed to permit runner repairs or replacements without disturbing in any way the generating or governing equipment.

Entire operation and control of the units is dependent upon the oil-operated governors. To insure continuity of service the oil pressure sets are installed in duplicate and each is arranged with a spare motor. Further, either is capable of supplying both governors.

### Electrical Equipment

Generators are of the vertical type each rated at 15,625 kva. at 11.45 kv., 3-phase, 60 cycles, 257 r.p.m. Each is equipped with a 140-kw. 250-volt direct-connected exciter. No spare exciter is provided and the capacity of each is such that it is capable of supplying excitation for only one generator. No means of inter-connection is provided. However, for emergencies a spare exciter armature is carried in stock at the plant and may be installed with but a short shut-down.

To provide for differential protection all six generator leads are brought out and Y-connected within a protective housing on the generator frame. This provides a location for the necessary current transformers. Temperature indications are available at the switchboard through six temperature coils located at as many different points in the generator winding and connected to an indicating instrument at the switchboard.

Fire protection is provided in the form of water sprays located one at each end of the stator winding. The generators take their cooling air down through the inspection passages in the dam, drawing it through the windings and discharging the heated air into the generator room. Dampers are arranged so that the air flow through each generator may be shut off in event of fire, thus restricting combustion and aiding the water jets.

which are largely self-explanatory, and from which detailed information may be gathered.

Direct current for control is supplied from duplicate storage batteries so arranged that either or both sets may be used at any one time. A 10-kw. motor-generator set is installed for charging purposes. A unique and useful feature of the battery installation is the fact that each battery is mounted on a suitable support, all cells on one level and at a height facilitating any maintenance or repair work. The height of the battery terminal lugs above the floor is about 30 in.

The operating gallery is located at the south end of the generator room and is fully open on the room side. The bench board is fitted with the usual control and indicating instruments and stands with its back toward the generator room enabling the operator to look through the board and watch the operating floor and equipment. Opposite the bench board and facing the operating room is a panel board carrying miscellaneous controls and instruments and the relays.

Both the motor-driven turbine valves and the motor-driven by-pass valves are controlled from the switchboard.

The guaranteed generator efficiencies are:

Full load.....	96.92	per cent
Three-fourths load.....	96.7	per cent
One-half load.....	96.0	per cent
One-fourth load.....	93.45	per cent

The guaranteed turbine capacities are:

Full gate.....	17,800 hp. at 88	per cent efficiency
0.9 gate.....	16,600 hp. at 89.5	per cent efficiency
0.8 gate.....	15,300 hp. at 89.5	per cent efficiency
0.7 gate.....	13,700 hp. at 90	per cent efficiency
0.6 gate.....	11,800 hp. at 88.3	per cent efficiency
0.5 gate.....	9,700 hp. at 85.5	per cent efficiency

## Principal Equipment

The two 96-in. oil-operated slide-gate valves as well as the two 60-in. gate valves were supplied by the Llewellyn Iron Works, Los Angeles, as were the fourteen spillway gates. Two 60-in. Johnson valves and two 96-in. free discharge valves were manufactured by the Pelton Water Wheel Company, San Francisco. The 96-in. needle valves were supplied by the Wellman-Seaver-Morgan Company. The turbines were made by the I. P. Morris Department of Wm. Cramp & Sons Ship & Engine Building Corporation and generators by the Westinghouse Electric & Manufacturing Company. Switchboards, transformers, oil-circuit breakers and motor-generators were supplied by the General Electric Company and the disconnecting switches, insulators and miscellaneous power house equipment by the Electric Power & Equipment Corporation.

Bent Brothers, Inc., of Los Angeles, were the contractors for the construction of the dam and power house with M. H. Slocum as superintendent in charge of the work. R. V. Meikle was chief engineer, A. J. Wiley, consulting engineer, Ross White, resident engineer, Daniel McFarland, assistant resident engineer, C. E. Pearse, designing engineer and R. W. Shoemaker electrical engineer for the irrigation district.

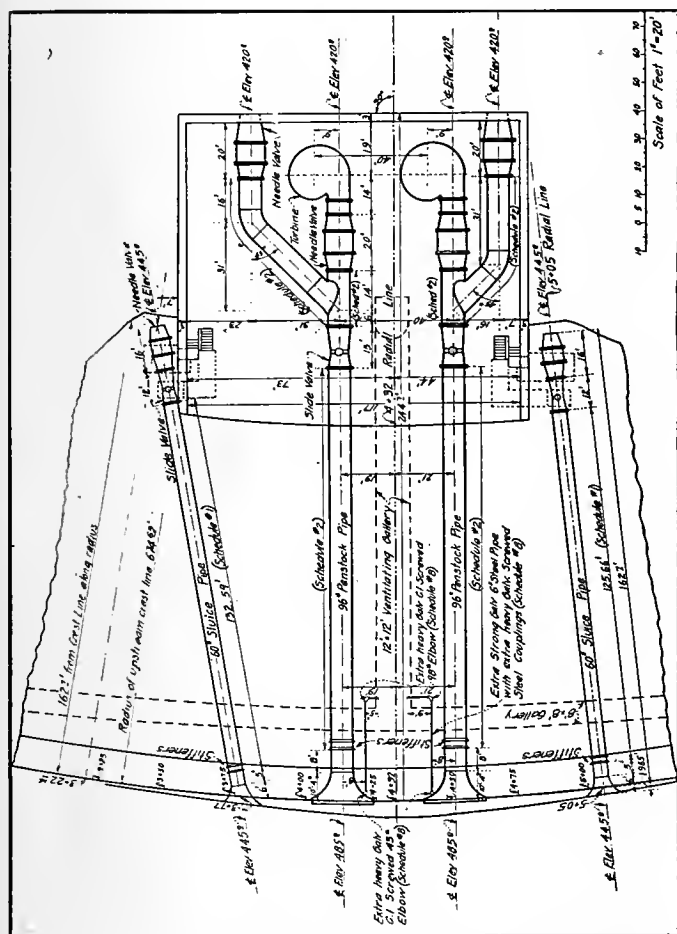


Fig. 4. Plan showing outlet pipes through dam.

Air brakes on each generating unit are capable of stopping the unit in less than five minutes with the field excitation entirely removed. Also these brakes are capable of lifting the entire rotating element of the unit a distance of 1in. to facilitate adjustment of thrust bearings. This is done with a unit pressure of less than 1,000 lb. per sq.in.

Each generator is connected to the 11kv. bus through duplicate oil circuit breakers rated at 1,200 amp., 11 kv., and having an interrupting capacity of 13,000 amp. at 11 kv. From this bus leads go directly to the low-tension terminals of the transformers. Station service is taken off of the 11-kv. bus through duplicate oil circuit breakers to a bank of 3-100 kva. transformers.

The transformer bank consists of three 10,400-kva., 11/110-kv. units and one spare. The bank is delta-connected and arranged for differential protection. The general arrangement of this equipment is indicated in the accompanying photographs

# Dr. Ryan Receives Edison Medal at A.I.E.E. Convention

**S**UBJECTS relating to the transmission and control of electrical energy formed the largest group considered by the Pacific Coast convention of the American Institute of Electrical Engineers at Salt Lake City Sept. 6-10, 1926. Many other subjects of interest went to make up the well arranged program, notable among which were studies on lightning and on engineering education and on developments in electrical machinery. Well planned entertainment features provided adequately for members and guests during the time not occupied by business sessions.

This convention marked the inauguration of C. C. Chesney, vice-president and chief engineer of the General Electric Company, Pittsfield, Mass., as president of the Institute. In his address Mr. Chesney outlined and emphasized certain policies which should govern the activities of the Institute this year.

Governor G. H. Dern of Utah welcomed the delegates and guests. Governor Dern stated that the electrical industry was as yet in its infancy. He compared the spirit of electrical engineers with that of Western pioneers, the broad visions of each group playing important parts in advancement of the status of the human race. Governor Dern himself is an engineer and it was to this fact that President Chesney called attention in his response, stating that it denoted significant progress in American politics.

## Industrial Advancement

In an address of unusually broad scope President Chesney prefaced his weightier remarks with an outline of the electrical history of the United States. Significant in this electrical development and particularly that of transmission and interconnection is the coming decentralization of industry. Those who have made the greatest contributions to the present state of advancement of the electrical industry are Wm. Stanley (the transformer), Nicola Tesla (the induction motor), Benjamin Lamme (rotary converter and other machines), Shallenberg (induction meter), and C. P. Steinmetz (mathematical solution of electrical problems). In the light of these important contributions Mr. Chesney urged that research be carried on unfalteringly, quoting at length from Dr. J. B. Whitehead of the research committee.

**P**RESIDENT CHESNEY'S announcement of important policies, the presentation of the Edison medal to Dr. Harris J. Ryan, and a good program combined to make the Salt Lake convention of the Pacific Coast division of the American Institute of Electrical Engineers a success. Mr. Chesney stressed the vital importance of research and standardization in the future development of the electrical industry and urged the unified efforts of the Institute in that direction.

Parallel to and allied with research, in the opinion of President Chesney, is standardization. He outlined the history and development of standardization, covering the more recent activities both in this country and abroad and showed the enviable position earned by the Institute in this work. Some of his vital statement on this subject follow:

"The American Institute of Electrical Engineers for the past 25 years, through its standards committee, has taken the initiative in the formulation of all electrical standards of America, and

its work is recognized as being authoritative throughout the entire world. Its procedure and its resulting standards during this period have been acceptable to the manufacturing and the consuming interests as well as to the general public. The industry has learned to value and to depend upon the A.I.E.E. standards in commercial transactions covering matters of interest to all sections of the electrical industry. It has made no effort to dictate to industry, but introduces standards on any particular line only when it is clear that all interested parties are in agreement that the step is wise and desirable. . . . In the Institute standards committee, or in its subcommittees, the manufacturer and purchaser and the general interests come together and develop the required standards in a way which has been generally satisfactory to all the interested sections of the industry. The electrical standards so issued have been identified with the name of the Institute, and its name should be continued in connection with them, and in the interest of simplicity and order it would appear that no other name is necessary. It should be remembered that the Institute as an organization has no interest other than one of public service, which duty the Institute has performed throughout the entire period of 25 years at its own expense. The Institute, therefore, in connection with the voluntary formulation of electrical standards has assumed obligations during the past quarter of a century which make it now impossible to discontinue the present practice or lessen its responsibilities until a more simple and direct method has been devised and demonstrated."

Two groups of papers were presented dealing in general with problems relating to transmission and control of electrical energy. One of these groups



dealt with the scientific and theoretical side and the other with the practical phases and operating experiences.

The space charge that surrounds a conductor in corona at 60 cycles was the subject discussed by Dr. Harris J. Ryan and J. S. Carroll, both of Stanford University. Work concluded so far proves that alternate positive and negative space charges do exist adjacent to a conductor in corona and that under conditions of very high voltages these may extend as far as 6 ft. from the conductor, forming a charged cylinder about the conductor. So far this work has been carried on with miniature models, but is planned to be continued on a larger scale. Questions brought the statement from Dr. Ryan that as yet it could not be ascertained whether or not the different velocities of positive and negative ions affected the space penetration of the space charges.

The circle diagram of a transmission network was discussed by F. E. Terman, also of Stanford University. The author's treatment of the subject is in elaboration of work previously done by others. It co-ordinates the graphical and mathematical methods of diagram construction and extends their applications. It also gives important geometrical checks which may be applied easily to computations, resulting in the production of a diagram almost error-proof and of great usefulness.

The calibration and interpretation of Lichtenberg figures as obtained from transmission disturbances were covered in a paper by K. B. McEachron of the General Electric Company, Pittsfield, Mass. This paper gives the results of a comprehensive study of the effect of transients upon the size and appearance of Lichtenberg figures. In general, three types of figures were found to exist and results showed that the value of voltage, the peak frequency, and the wave-front characteristics affected the figures. Dr. Joseph Slepian of the Westinghouse Electric & Manufacturing Company complimented the author's work and voiced the opinion that the basis of the figures was the ionization of gas immediately adjacent to the film. He based his opinion upon the fact that the figures differ with the gas and the pressure used. In gaseous ionization of this character the effect of leakage conductance would be appreciable at low frequencies, but not at high frequencies. Therefore it was his opinion that it was unsafe to attempt to use any constant relation between crest voltage and figure size.

#### Transmission Construction

L. R. Gamble presented a paper describing certain of the construction practices of The Washington Water Power Company as applied to that company's 110-kv. lines. This paper covered some of the standard structures used and one or two novel features such as the insulation of a long-span section of telephone line to permit it to be used for power purposes in case of the loss of a power conductor, and the use of heavy iron weights as "hold-downs" where unexpected upstrains were encountered in stringing conductors. He described also the use of a chemical dust for the preservation of poles, 7 lb.

of this dust being placed in the pole hole as it is tamped in. Questions brought out the fact that this dust is poisonous and that the men handling it wear gloves and otherwise protect themselves, but that no injury to animals has occurred.

New construction standards and methods as adopted by the Southern California Edison Company on its Vincent line were presented by C. B. Carlson and H. Michener of that company. Some of the outstanding features of this line are the use of but 3.94 towers per mile over its 223.5-mile length; the turning of angles up to over 11 deg. on standard suspension construction; the use of 1,033,500-circ-mil aluminum cable reinforced with 134,000-circ-mil steel core; and the use of standard 64-ft. suspension and 56-ft. dead-end towers with 7, 14 and 21-ft. standard extensions as needed.

High-tension construction in the East was touched upon by E. S. Healy and A. J. Wright of the Electric Bond Share Company. In this paper were presented numerous experimental data regarding unbalanced conductor tensions and loadings and their effects in a long-span transmission line. Computations were at least partially verified by actual test upon a half-mile section of experimental line. The results were used in the design of the 220-kv. Wallenpaupack-Sigfried line of the Pennsylvania Power & Light Company. Unusually heavy loading conditions were considered and the results were interesting.

#### New Switch Design

One of the notable papers of the convention was that of R. W. Sorensen and H. E. Mendenhall of California Institute of Technology. A series of experiments were described that give great promise of the development of a commercially successful vacuum-type switch of extremely small dimensions that would interrupt large currents at high voltages. The maximum operating strain used in the experiments on the switch, which can be held in the palm of one hand, was 926 amp. at 41 kv. Such a load was interrupted numerous times without any pitting of contacts or other signs of stress in the switch. P. M. Downing of the Pacific Gas and Electric Company observed that this potential development was very welcome due to the fact that oil circuit breakers are extremely expensive and not entirely satisfactory. Dr. Slepian of the research division of the Westinghouse Electric & Manufacturing Company stated that the results of Prof. Sorensen's experiments called for a revision of the theory of the electric arc. Until recently the thermionic emission theory has held, but has given way to the present gaseous ionization theory. Experiments seem to show that a gas is not necessary to permit a cold-cathode emission, and also show the necessity of further experiments and research to establish the true facts. G. E. Prince of the General Electric Company suggested that a theory applied to the performance of mercury-arc rectifiers might obtain for vacuum switches. This suggested that collision-ionization occurred and that positive ions flowed to the cathode establishing a space charge giving a high potential gradient near

the cathode and resulting in the pulling of ions from the metal. Further discussion brought out the fact that even the best so-called high vacuums did not eliminate all of the gas, some remaining in the switch acting as an emissivity agent. Experiments seem to show that electrons are not pulled readily from metal under a metal temperature of at least 1,000 deg. F.

The temperature of a contact and related current-interruption problems were discussed in a paper by Dr. Joseph Slepian. The author derived a formula for computing the temperature of the last of a pair of separating contacts. The relation of this value to arcing at a switch-tip, to brush drop and to commutation was covered in the paper and numerous experiments on the interruption of a current by a vacuum switch were described.

### Engineering Education

In presenting his paper on this subject H. H. Henline of Stanford University gave some valuable suggestions in the arranging of engineering curricula and aroused perhaps the most lengthy and complete discussion of any of the papers presented. The object sought by Prof. Henline in his 4-year engineering course, leading to an A.B. in engineering, plus a 2-year additional course, leading to the degree of Engineer in the subject chosen, was better to prepare the average engineering student for the assumption of life problems than can be done with a 4-year specialized course. His idea is a broader and more cultural foundation for the engineering student and at the same time retaining the opportunity for advanced specialized study for those qualified. The discussion in general was in support of the proposals, differing mainly in minor points and in methods of application.

### Lightning

A study of lightning rods and cages, with special reference to the protection of oil tanks, was given by F. W. Peek, Jr., of the General Electric Company. The paper is a further report of the work that the author has been carrying on for several years. Special attention is given to the probability of objects being struck, the area protected by rods or overhead wires, the effects of nets and cages in reducing induced voltages, and in particular a series of experiments pertaining to oil-tank protection. The author concludes that a vertical rod will protect an area having a radius of about four rod-lengths and that a properly arranged series of rods will fully protect the area between them from direct hits. Attention also is called to the fact that lightning discharges as far as a mile away will cause extremely high induced voltages resulting in damaging sparks. Some discussion between Prof. Sorensen and Mr. Peek brought out the fact that the differing results obtained in the California Institute of Technology laboratory were due to the use of high-frequency, oscillatory discharges of a much greater time element than the truly non-oscillatory complete discharge used by Mr. Peek.

Mr. Peek concludes that the only full protection to an oil tank is the use of an all-metal tank. How-

ever, varying grades of protection may be obtained by rods in combination with bonded-metal roof.

### Mining Practice

Safety in electrical mining installations was the subject of a very candid paper by Daniel Harrington, consulting engineer of Salt Lake and chief safety engineer of the U. S. Bureau of Mines. The author stressed the many advantages of mechanizing the mines, and of the use of electricity in particular. However, he pointed out forcibly that manufacturers should produce only acceptably safe electrical mine equipment and that installations should be so supervised as to insure proper application and rigid maintenance to reduce hazards. Electrical practice in the lead-silver mines of Utah was the subject of a paper presented by Leonard Wilson, consulting engineer of Salt Lake.

The application of electric drive to power shovels is one of great interest. The development and operation of variable-voltage a.c. equipment for this class of service was covered in a paper by R. W. McNeill of the Westinghouse Electric & Manufacturing Company.

### Stability and Electrical Machines

The steady-state stability characteristics of small alternators were treated in a paper by O. E. Shirley of the General Electric Company. Tests made give the basis from which the value of short-circuit ratio may be derived, this ratio being the best guide for determining machine stability. A series of curves were developed from the data given the stable short-circuit ratios for alternators in general service. Load characteristics were influential in the determination of steady-state stability limits according to the author. An operating margin of about 15 per cent in voltage, or about 5 per cent in kva., was recommended.

Calculation of the synchronizing power in synchronous machines was covered in the paper by H. V. Putman of the Westinghouse Electric & Manufacturing Company. The author derived certain formulae and proposed methods of solution by which the synchronizing power of machines might be calculated fairly accurately under almost any conditions likely to be met with in practice. Greater accuracy is claimed for the proposed solution than that possible with present methods. Active discussion of this paper brought many dissenting views from C. A. Nickle regarding the author's methods and procedure. Mr. Putman rebutted by saying that any workable solution of this problem was subject to certain assumptions and minor errors, an exact solution being practically impossible. He pointed out that the best check on methods of solution was the commercial success of machines so designed and that machines designed by his formulae were giving entirely satisfactory operation.

### Generator Fire Protection

The latest in fire-protection schemes for water-wheel generators was described by J. A. Johnson of the Niagara Falls Power Company and E. J. Burnham of the General Electric Company. The

system outlined is designed to limit both fire and water damage to the immediate section where the fire occurs. This is accomplished by air baffles which so control the flow of ventilating air that the whirling action common in the end windings is overcome, and by the use of fusible sprinkler heads which permit the application of water nowhere but at the scene of the fire. The sprinkler heads are under air pressure through a restricting valve so that the operation of a head causes a reduction of air pressure in the line and causes the sounding of an alarm through the operation of a contact-making pressure gage. The operator then can investigate and turn water into the sprinkler line only if the seriousness of the fire justifies that method of extinction.

### Communication

Transmission features of transcontinental telephony and attendant design considerations were described by H. H. Nance and O. B. Jacobs of the American Telephone & Telegraph Company. The paper covered the communication channels obtained from transcontinental facilities and included carrier-current systems, repeaters and signalling systems. One of the interesting features was an explanation of the so-called network broadcasting service such as that used to broadcast the inauguration of President Coolidge.

A practical application of carrier-current telephony to submarine cables was described by W. W. Hitchcock of the Southern California Telephone & Telegraph Company. The installation described is in operation between the mainland and Santa Catalina Island, off the southern California Coast. This system is the only one in operation on deep-sea cables, the shortest (26 miles) such system in commercial operation, and provides six channels of conversation.

Telephone insulation difficulties such as encountered in the vicinity of the Great Salt Lake were covered by B. F. Howard of the Mountain States Telephone & Telegraph Company. The description gives results of observations and operating practice on different lines in that area. Salt, ice and fog combine against communication lines there and the author gave an outline of the methods used to combat these conditions.

### Entertainment

Numerous well planned features provided an excellent class of entertainment for delegates and guests. An organ recital in the celebrated Mormon tabernacle, a trip for the women about the city and nearby canyons, and an evening at the famous Saltair resort on the Great Salt Lake were on the first day's program. Tuesday the women were guests at the country club for luncheon and golf. In the evening an informal reception, musical program and dancing brought a large crowd to the ballroom of the Hotel Utah. On Wednesday an excursion took the women to Pinecrest Inn at the head of Emigration Canyon for luncheon. President Chesney addressed the first meeting of the season of the Salt Lake Chamber of Commerce at which a large number of Institute delegates were present. Honors in the Tuesday afternoon golf tournament

were carried off by P. M. Downing, regional vice-president of the Institute and vice-president of the Pacific Gas and Electric Company.

### Ryan Receives Edison Medal

The outstanding feature of the convention was the presentation of the Edison Medal to Dr. H. J. Ryan of Stanford University. Dr. Ryan is one of the best-loved members of the Institute if not of the entire electrical profession and the occasion of his honor in the receipt of the Edison Medal was a most impressive one. President Grant of the Mormon Church, U. S. Senator Reed Smoot of Utah,



DR. HARRIS J. RYAN

Mayor Neslen of Salt Lake and National Secretary Hutchinson of the Institute were among the notables at the head table with Dr. Ryan.

In following the official method of procedure for such occasions President Chesney called upon Secretary Hutchinson to outline the significance of the Edison Medal, and upon P. M. Downing to give a biography of Dr. Ryan. Subsequent to this President Chesney presented the medal and certificate to Dr. Ryan who responded with a heartfelt message.

### Inspection Trips

During the golf tournament those not participating were taken to Terminal substation of the Utah Power & Light Company where they witnessed high-tension substation construction as practiced by that company. Thursday afternoon a large delegation took the trip to the copper city of Bingham where they were the special guests of the Utah Copper Company. A full insight into mining operations and the application of electricity to the important phases thereof was obtained through this trip.

The two inspection trips to the generating plants of the Utah Power & Light Company proved interesting indeed. The Friday trip to the Cutler plant drew a crowd that was unable to take the time necessary to see the whole system. Those who could were taken on a 2-day trip over the entire Bear Lake-Bear River system of the power company. This trip was especially instructive due to the unusual conditions met with in the erection and operation of this series of plants.

Not only the entertainment feature, but the entire convention was immensely enjoyed by all in attendance. Credit is due to convention chairman C. R. Higson of the Utah Power & Light Company and to his committee for the program that they put on.

# Rocky Mountain Convention Features Sales and Public Relations Problems

**I**NFILTRATED through each of the four business sessions of the Glenwood convention, and touched upon from one angle or another by a majority of the individual speakers, were the equally important subjects of sales and public relations. This meeting was the twenty-third annual convention of the Colorado Public Service Association and the seventh annual convention of the Rocky Mountain Division, N.E.L.A., held jointly at Glenwood Springs, Colo., Sept. 13-16, inclusive. One general session was held each morning, thus enabling all delegates to participate in and benefit from the activities of all four of the sections. Subjects taken up and addresses made at each of the sessions were so diversified that the sessions were of common interest to all.

Discussions pertaining to sales and commercial efforts outlined rather in detail and from many different angles the difficulties, necessities, opportunities and problems attendant upon the revision of sales programs and policies to meet present and coming conditions in the industry. It was interesting to note the wide interest in this subject and its intimate relation to other phases of the industry's endeavors.

Public relations, for want of a better term, its problems and opportunities for successful development to a sound status also appealed to many of the speakers. Here again the intimate relationship necessary between the public and every phase of utility activity was brought out from various viewpoints. It seemed to be the consensus of opinion that every person in every division of utility work must be selected and trained to discharge a proportionate responsibility in the development of the selling and the public relations problems of the industry.

Activities of the associations in the Rocky Mountain region during the year 1925-26 have resulted in a closer tie between the various utilities serving that region, and in a closer understanding between the utilities and the general public, according to E. F. Stone, president, Colorado Public Service Association and assistant general manager, Southern Colorado Power Company. Mr. Stone's address served as the opening gun of the convention. In his remarks were set forth the various phases of the year's work and certain proposed activities for the coming year.

Of particular importance was his recommendation that the meetings of the state associations of Colorado, Wyoming and New Mexico be so rearranged as to permit a greater and fully co-operative joint annual convention. Mr. Stone recommended that each state association hold one purely local convention each year to transact business of a local character only. He further recommended that the Rocky Mountain Division, N.E.L.A., limit

its convention activities to the one annual joint convention at Glenwood Springs, Colo., and that such annual convention be fully and officially participated in by each of the state associations. This scheme Mr. Stone believes will result in greater and far more beneficial co-operation between the state associations, greater and more representative attendance at the joint convention, and the accomplishment of a greater amount and higher quality of work in the three states involved, jointly and severally.

The N.E.L.A. has been instrumental in bringing about the most perfectly co-ordinated industry in the world, according to R. F. Pack, president of the N.E.L.A. and vice-president and general manager, Northern States Power Company, Minneapolis, Minn. Standardization of equipment and apparatus and the promotion of a uniformity of thought and purpose within the electrical industry are some of the particular accomplishments touched upon by Mr. Pack. He compared the electrical industry in the United States with that in England and stated that the U. S. produced more kw-hr. in 1925 than did all the rest of the world together. He also stressed the importance of the national convention in the scheme of a co-ordinated industry.

In discussing the activities of the Public Relations Section C. A. Semrad, chairman of that section and vice-president and general commercial manager, Public Service Company of Colorado, stressed the obvious fact that only with the good will of the general public can the electrical industry advance successfully. He strongly intimated that more serious work and less talk was needed in this important work. In an attempt to analyze the public relations problem Mr. Semrad pointed out that the public has consistently received greater service from the electric utilities than from any other business enterprise. He believes the source of the trouble to be elsewhere; to be in the fact that development in the production and application of electricity and the growth of power systems and organizations have been so great and so rapid that they have grown completely out of common public understanding. The industry is growing far more rapidly than are public knowledge and conception of its aims.

The electrical industry sells an intangible commodity and gives with it an extensive service while the average business enterprise sells a tangible commodity with only a negligible service. This fact makes essential a definite effort in confidence building, in the belief of W. A. Jones, chairman of the Public Relations National Section and chairman of the executive committee, Henry L. Doherty and Company. Mr. Jones stated that the delayed realization of this fact has resulted in engendering an involved mistrust in the mind of the average person



outside of the industry. The lack of truthful information regarding the various phases of the industry has been taken as prima facie evidence that the utilities were conducting their business in a purely selfish way.

The extensive possibilities of properly handled advertising in getting business and in building public good will were elaborated upon in a paper prepared by Herbert Metz, advertising manager of the Graybar Electric Company and presented by A. C. Cornell of that organization's Denver office. In his paper Mr. Metz outlined as an example the many difficulties attendant upon the change in the name of his company. He pointed out the many angles of the problem including the selection of a name with a definite significance, the care necessary in preparing a monogram and the methods of advertising to establish both. As a feature in furtherance of utility public relations Mr. Metz urged the use of space in programs and leaflets published by churches, societies, etc., the full use of local papers and other publications, and generous contributions to all worthy public enterprises such as parks, monuments, playgrounds, etc.

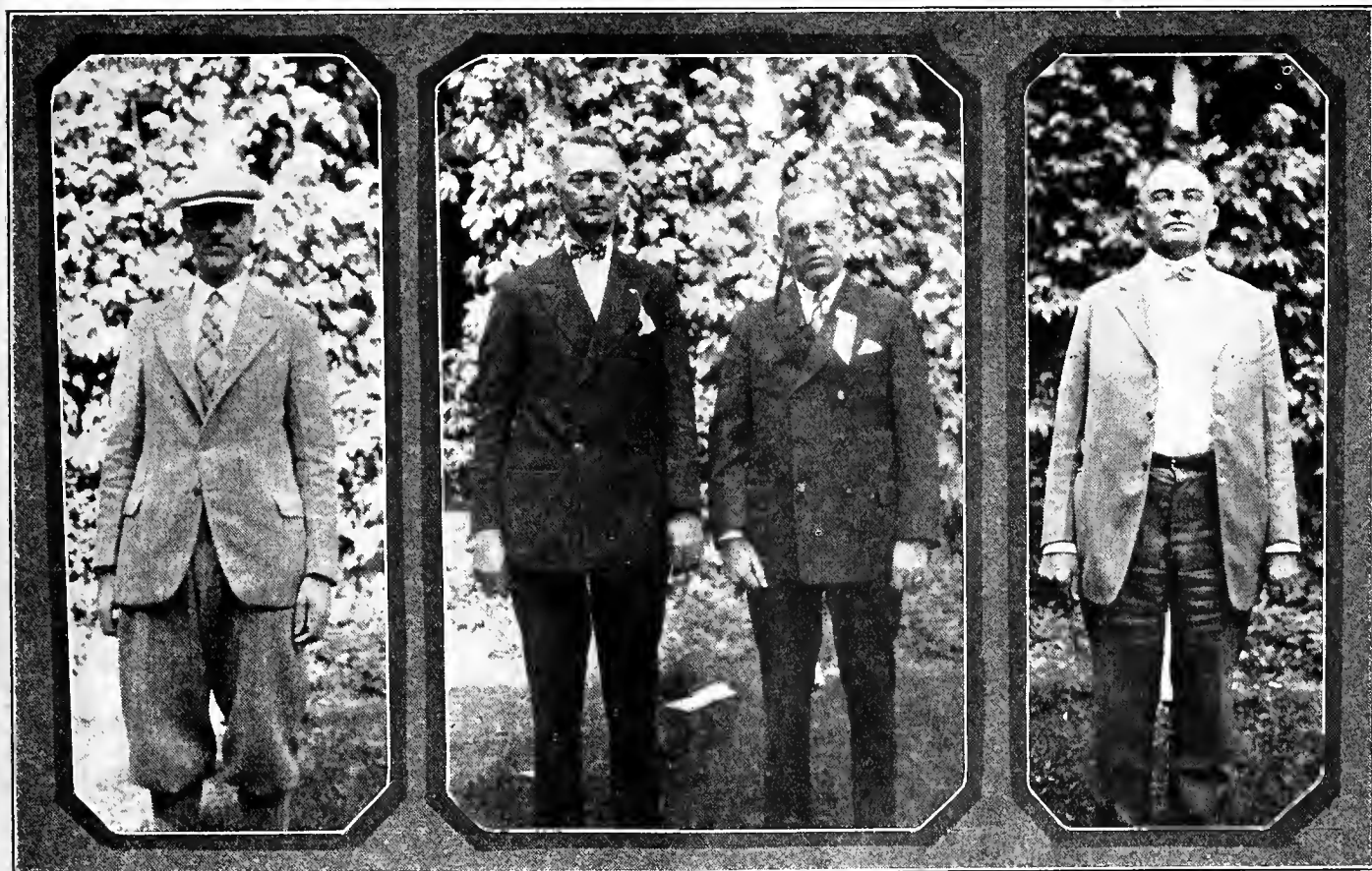
The selling problem of the industry was discussed and analyzed in a paper prepared by G. C. Tenney, managing editor of the Journal of Electricity and presented by R. Ross Henninger, associate editor of that publication.

A symposium of ideas on effective advertising and publicity was contributed to by E. A. Bemis,

state field secretary of the Colorado Editorial Association; L. W. W. Morrow of Electrical World; J. F. Greenawalt, vice-president of the Colorado Public Service Association and publicity manager of the Mountain States Telephone and Telegraph Company; and G. Ross Henninger of the Journal of Electricity. The general consensus of opinion seemed to be that effective advertising must follow a definite program, be instructive, be terse, be illustrative and illustrated, and be directed definitely toward a particular objective.

Arthur Praeger, president of the Rocky Mountain Division, N.E.L.A., and general manager of the Albuquerque, N. M., Gas & Electric Company, opened the second day's session with an address covering some of the managerial problems. Mr. Praeger stressed the fact that the successful utility manager must be an untiring student of utility development and advancement. He spoke of the important part played by the standard trade papers which he characterized as the torch bearers of the industry, warning of dangers and leading in development. The first and most important step toward better public relations lies in a "house cleaning" wherein every employee is so selected, treated and trained that he becomes a booster and a disseminator of facts regarding the industry. High ethical standards are essential in Mr. Praeger's belief and absolute honesty the most important quality of utility business.

Some interesting conceptions of the electric utili-



A. A. Weller (left), Public Service Company of Colorado, Denver, was convention chairman as well as secretary of the Rocky Mountain Division, N.E.L.A., and secretary-treasurer of the Colorado Public Service Association. Center: Two presidents, one retiring, one incoming. E. N. Stone, Southern Colorado Power Company, retiring president Colorado Public Service Association, and J. F. Greenawalt, Mountain States Telephone & Telegraph Company, newly elected president. Right: James Potts, manager, Rawlins (Wyo). Light & Fuel Company.

ties from an outsider's viewpoint were discussed by R. M. Crane, president of the Denver Chamber of Commerce. In his opinion the one real problem of the utilities is to overcome a lack of public interest in utility development. This must be done by a terse presentation of forceful facts.

Development of the technique of the industry was touched upon by W. D. Johnston, chairman of the division Engineering Section. A paper by C. F. Hirshfeld, chairman of the Engineering National Section, was presented by Mr. Johnston. This paper dealt with certain economic features of power system interconnection. The obligation of the electrical industry to educate the remaining rural population to the full use of electrical energy was stressed by J. A. Clay, chairman of the rural electric service committee. The advantages accruing from the careful planning and execution of adequate wiring jobs were outlined by Geo. Bakewell, Jr., executive manager of the Electrical League of Colorado. Mr. Bakewell also outlined the activities of the League toward securing the installation of greater electrical service facilities in all new buildings erected in the territory served by that organization.

The general public is essentially fair-minded, according to E. W. Hodges, manager of public relations for Henry L. Doherty and Company of New York, who was the outstanding orator of the convention. In his belief if the public be made acquainted with and interested in the many important details and problems of public utility work that public will respond with a genuine interest in the progress of the utility, realize its importance to the community, and cease to be subject to political leadership. Some of the many other highlights of Mr. Hodges' address were as follows: the public resents being "educated," but openly accepts information properly presented; "service" and "public relations" both are worn-out terms, representing too much talk and not enough genuine work and constructive effort; the purchase of a so-called "public relations man" is but a minute step in the right direction and is justified only in an organization so large that the general manager himself cannot attend to the details of such work; successful public relations improvement rests ultimately upon such an internal condition of the utility that every person on the payroll is a whole-souled emissary for the "cause."

The situation in which the street railways now find themselves and its contrast with that of practically every other utility was the subject of an interesting and extended discussion by S. B. Irelan, general manager of the St. Joseph, Mo., Railway, Light, Heat & Power Company. Mr. Irelan is a decided optimist on the question and presented facts and figures of particular value to traction interests.

Due to his severance of connection with the N.E.L.A., M. H. Aylesworth, formerly managing director of the association, was not present to take his scheduled place on the program. G. A. Davis, manager of public relations for the Oklahoma Gas & Electric Company spoke in his stead on the subject of a successful public relations organization.

Mr. Davis characterized "public relations" as the outward expression of an inward grace, and that its success depends upon a full realization of duty to the public.

Activities of the local accounting section were outlined by W. J. Benning, chairman of the section and general auditor of the Southern Colorado Power Company. Speaking further in behalf of the importance of proper accounting, W. R. Emerson, vice-chairman of the Accounting National Section and treasurer of the Oklahoma Gas & Electric Company, stressed in particular the value of accounting records in rate cases. He stated that the quality of the man-power in the industry must be brought up to a parity with the quality of the product of the industry.

Insurance is one thing from which few utilities get the fullest possible value, due to their own oversight, according to J. E. Loiseau, chairman of the insurance committee and secretary of the Public Service Company of Colorado. Mr. Loiseau stressed the importance of constant study of the insurance problem to assure the greatest protection and return, giving many specific instances.

To assist in the establishment of a friendlier feeling between the utilities and their customers, Mr. Loiseau suggested the adoption of a form card or letter which would be issued to a customer leaving a city. This letter or card to be issued only to those customers having regularly paid their bills and otherwise established satisfactory credit relations with the issuing utility during a minimum 6-month period. The letter or card to be an introduction and recommendation of the customer to the receiving utility and to be recognized by and among all of the utilities in the Rocky Mountain Division of the N.E.L.A. The receiving utility may further cement the good will of the customer bearing such an introduction by waiving the service deposit or in any other way desirable. After discussion the plan was adopted for a year's try-out.

The aggressive enthusiasm and peculiar qualifications of the women in the industry have proved them to be the logical medium of approach to the housewife and the most important channel through which to effect the full electrification of the home. This keynote of women's activities was sounded by Isabell Davie, secretary of the women's committee of the Public Relations National Section. Miss Davie outlined the work of the women's committee explaining that it functions in a manner similar to any other N.E.L.A. section. Miss Davie complimented the women of the Rocky Mountain Division and urged them to further effort in view of the woman's inherent understanding of and contact with affairs and interests of the home.

An outline of the history of the development of modern communication was given by J. F. Greenawalt, vice-president of the Colorado Public Service Association and publicity manager of the Mountain States Telephone and Telegraph Company.

In the absence of W. H. Onken, Jr., editor of *Electrical World*, L. W. W. Morrow, managing editor of that publication, presented some valuable

information and suggestions incident to making the business of the electric utility more prosperous. Mr. Morrow gave reflections obtained from such work being carried on by certain of the electrical interests throughout the United States.

Reports were rendered by J. A. Clay, chairman of the rural electric service committee and general manager of the Western Colorado Power Company; and G. B. Buck, chairman of the Commercial Section and manager of the electric sales department of the Public Service Company of Colorado. Mr. Buck stressed several points among which were the following: the necessity of a radical change in sales program of most utilities; the failure of \$125-per-month men to handle the \$12,000,000 annual sales problem of the utilities; the necessity of carrying electrical merchandise to the home in selling efforts; that merchandising is secondary to an increased production and sale of kw-hr.

Officers elected at the convention for the Rocky Mountain Division, N.E.L.A., and to take office July 1, 1927, are as follows: president, W. C. Sterne, president and general manager, Municipal Properties Investment Company, Denver; vice-president, C. N. Stannard, vice-president and general manager, Public Service Company of Colorado, Denver; vice-president, E. P. Bacon, Midwest Public Service Company, Casper, Wyo.; vice-president, J. A. Clay, general manager, Western Colorado Power Company, Durango, Colo.; members-at-large, A. C. Cornell, manager, Graybar Electric Company, Denver; James

Potts, manager, Rawlins Light & Fuel Company, Rawlins, Wyo.; K. W. Kissick, manager, Deming Ice & Electric Company, Deming, N. M.; E. F. Stone, assistant general manager, Southern Colorado Power Company, Pueblo, Colo. Both Mr. Stannard and Mr. Bacon, respectively, were in line for the presidency of this organization, but declined the nomination under the plea of press of work.

Officers elected for the ensuing year, 1926-27, for the Colorado Public Service Association are as follows: president, J. F. Greenawalt, publicity manager, Mountain States Telephone and Telegraph Company; vice-president, H. S. Robertson, general manager, Denver Tramway Company; vice-president, V. L. Board, general superintendent, Public Service Company of Colorado; executive committee, W. P. Southard, Trinidad (Colo.) Electric Transmission, Railway and Gas Company; Fred Norcross, Home Gas and Electric Company, Greeley, Colo., and J. A. Clay, Western Colorado Power Company, Durango, Colo.

The guiding genii of the entertainment program were Mr. and Mrs. J. J. Cooper of Denver. The elaborate program included a golf tournament, horseshoes pitching contests, water carnivals in the outdoor pool supplied from natural hot springs, motor trips and bridge tournaments for the ladies, and outdoor feast and barn dance at a nearby retreat, dancing in the evenings and last and a fitting finale, the annual banquet presided over by J. C. Burger as toastmaster.



W. A. Jones (left), treasurer, N.E.L.A., and chairman of the Public Relations National Section. He is chairman, executive committee, H. L. Doherty & Company. Mr. and Mrs. J. J. Cooper (at center), the heart of the entertainment program. Mr. Coope is connected with the Mountain Electric Company, Denver. J. A. Clay (right), Western Colorado Power Company, Durango, Colo., and chairman of the rural electric service committee.



# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Tower per Day Going Up on Vincent 220-kv. Line Rapid Progress in Erection of Edison Company's New Line Made Possible by Novel Methods Used

By J. B. WHEELER, Superintendent of Construction, Southern California Edison Company,  
Los Angeles

Construction work on the new 220-kv. transmission line between the hydro-electric plants of the Southern California Edison Company situated on the Big Creek and San Joaquin Rivers and southern and central California is proceeding rapidly and according to schedule. Plans now call for completion of the southern half of the line, that is, the portion south of the Magunden switching station, near Bakersfield, Calif., to Los Angeles, early in 1927. The northern half of the line, extending from the Magunden switching station to the plants, is to be completed early in the spring of 1928, in time to take on the additional load occasioned by the completion of the Big Creek No. 2-A, fifth power house of the San Joaquin-Big Creek project.

To facilitate the matter of procuring rights-of-way over the 225-mile stretch the company ran this new line through mountainous territory just as far as possible. This necessitates the construction of 75 miles of road to make this right-of-way accessible first to the construction department and later to the operating department. The first stretch of road to be built was 38 miles long through a territory which hitherto has been accessible to none but the hardest type of mountain climber. This piece of road extends from near the Eagle Rock substation at the northwestern city limits of Pasadena to Vincent, a station on the Southern Pacific on the southern edge of the Mojave desert in Antelope Valley. Work on this road began Sept. 1, 1925, and was finished early in May, 1926. This 38-mile road was necessary for the construction and later maintenance of the initial 19-mile stretch of the new 220-kv. line. The width of this road is 9 ft. throughout with a maximum grade of 10 per cent. Approximately 300,000 cu.yd. of rock and soil were removed in the building of this road, the entire cost of which was about \$450,000, or approximately \$12,000 to the mile.

It was necessary first to break a trail through the virgin wilderness. This trail later was widened out making it possible to get through with small tractors, later followed by the road-building machinery used to complete the work. Approximately one pound of powder was used per foot of road built.

There will be 826 standard towers and 21 anchor towers throughout the entire length of 223½ miles of line. These towers have a height of 55 ft. to the conductor with extensions in

7-ft. multiples allowing the towers to be built up to 90 ft. A standard tower weighs a little more than 5 tons and is made up of 268 members fabricated with 867 bolts. An anchor tower weighs approximately 10 tons and has 291 members with 1,260 bolts. These tow-

ers are shipped to central receiving stations at various convenient points along the right-of-way and are distributed thence to the proper location unit by unit.

When it is remembered that, should a single member of a tower be missing when the erection begins, an entire crew of men is held up until the missing member can be obtained it may be appreciated how important it is that the shipping clerks in the various supply centers shall know their business. The standard time for erection has been set at 8 hours, although there have been a few instances when a tower has been built in 6½ hours. The towers will average approximately 4.2 towers per mile throughout the line.

Conductor cable is 1,033,500 circ.-mil in cross-section and made up of 54 strands of aluminum and 7 strands of steel. It weighs 1½ lb. per ft. A new splice has been developed with a steel compression sleeve on a steel core and aluminum compression sleeve over all. These compression sleeves distribute the stresses throughout the composite splice. The aluminum strands are removed from the 7 strands of steel at the two ends of the cable which are to be spliced and these 7 strands of steel then are inserted into opposite ends of a steel sleeve. Over this entire steel sleeve and extending back over the aluminum strands of the cable proper an aluminum sleeve is placed. Then under a hydraulic press with a pressure of 80 tons these sleeves are compressed until the splice has become practically a solid piece of metal with tensile strength greater than that of the cable itself.

In the actual stringing of the cable many refinements have been instituted. Roller-bearing blocks with a specially constructed come-along have made it possible to hook a 10-ton tractor to the end of 5 miles of cable and pull this whole length up to 12,000-lb. tension in one operation. Under the old type of construction one mile of cable at a time was considered to be the limit, it being the custom to pull approximately a mile of line up to tension and then dead-end it. It has been discovered that under the new system it is possible to pull up the 5 miles of cable and merely clamp the line to all the insulator strings without dead-ending. When the cable is unhooked from the drawbar of the tractor it has been found that the entire pull of the 5-mile line section is absorbed and counter-balanced by the dead-weight of the five last spans of line. In other words the strings of insulators on the last five towers strung will be pulled slightly off their vertical line, but the insulators on the sixth tower back from the end of the line hang down perfectly straight and are not affected by the fact that the line has not been dead-ended.

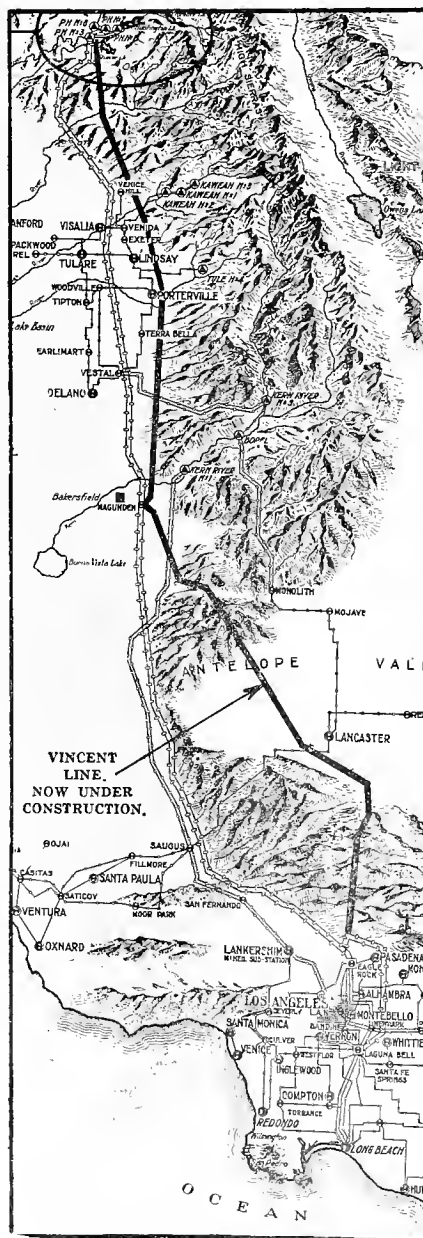


Fig. 1. Map of major portion of Southern California Edison system showing relation of new 220-kv. Big Creek transmission line.



There are 13 units on the single suspension strings used on the ordinary line towers. Where there is a par-

Every reasonable means possible is taken by the company to maintain a happy working force. Young men,

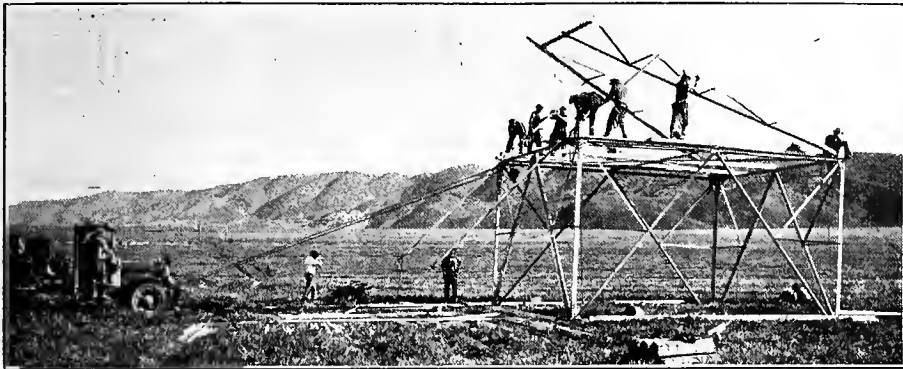


Fig. 2. Tower in course of erection. Foundation sections of three others may be discerned in the distance.

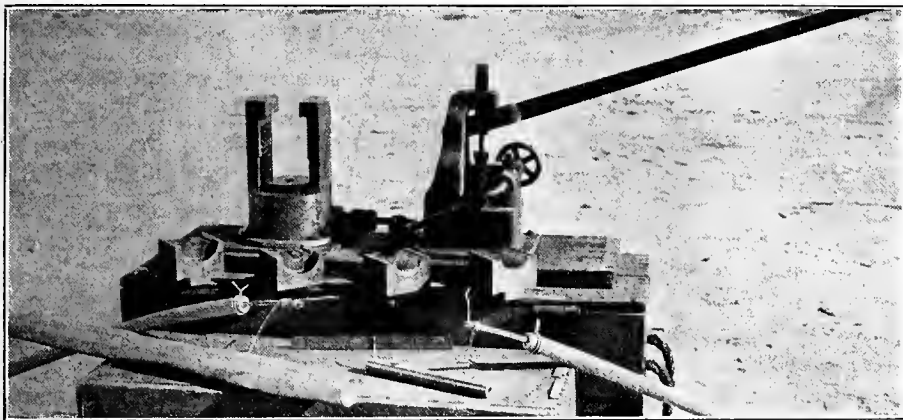


Fig. 3. All ready to make a splice in the steel-core aluminum cable, showing aluminum stripped from steel core, steel sleeve, aluminum sleeve, 80-ton hand-operated press and dies. Relative sizes may be determined from the 1-ft. rule on the box in the foreground.

ticularly heavy strain on the tower, such as on mountain peaks preceding long spans, the strings are doubled up making two strings in parallel holding the load. At the dead-ends 15 units are used on each of two parallel strings. These insulators have a strength test of 18,000 lb. All hardware is drop-forged or steel plate, no castings being used. On the straight-line towers the cable is suspended through the insulator; at the dead-ends a compression joint similar to that used in splicing has been adopted and is proving highly satisfactory. The length over all of a standard string of insulators is 9 ft.

A two-circuit telephone line strung on small full-length pressure-creosoted Texas pine poles follows the right-of-way of the transmission line.

Inasmuch as plans for the job indicated that it would last at least 30 months it was thought advisable that all motor and tractor equipment should be new. Hence 30 2½-ton trucks, 8 1-ton trucks, 17 light cars with a light truck body attached, 5 2-ton busses for hauling the men back and forth from camp to the work, 10 tractors ranging from 5 to 10-ton and 13 2½-ton trailers were purchased. This does not include 25 miscellaneous pieces of equipment such as compressors, graders, Fresno scrapers, plows, etc.

The entire line will require approximately 6,000 tons of steel, 25,000 tons of aluminum, 350 tons of insulators, 70 tons of hardware, and 500 tons of mis-

preferably from the farming districts cellaneous material such as packing material, reels and the like. adjacent to the right-of-way, are being used wherever it is possible to get them. These young fellows have proved to be exceedingly efficient work-

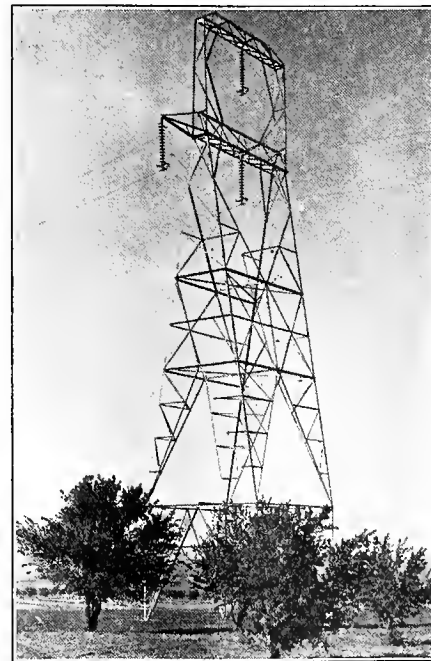


Fig. 4. Transposition tower.

men and eliminate the danger which might come from having the old-time, hard-to-handle, drifting, migratory labor which otherwise might be attracted to the job. Every camp comfort that it is possible to supply is furnished to the men. Excellent quarters carefully kept, numerous shower baths and other sanitary equipment are furnished at each of the camps.

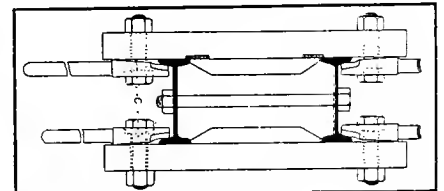
To preserve and keep in the best of condition the 30,000 lb. of meat that is consumed monthly, large electric refrigerator units have been installed in each camp. In addition to the 30,000 lb. of meat 20,000 lb. of other food stuff and 5,000 lb. of miscellaneous supplies are consumed each month. Preparation of this food is in the hands of capable stewards who have under them the best camp cooks obtainable.

A force of approximately 500 men will be maintained throughout the period of the job. Work is organized on the basis of 8 hr. per day.

The estimated cost of the completed job with appurtenant substation and switching equipment has been placed at \$11,000,000.

### Unique Design of Steel-Concrete Pole Used in Australia

Another idea in pole design and fabrication now comes to the front. J. C. Stobie of the Adelaide Electric Supply Company (Australia) has invented the pole, a cross-section of which is shown in the accompanying sketch. As may be noted, the essential features of the pole are the two light I-beams forming the outside stress members and the spacer bolts which regulate the separation of these two members. The stay bolts are placed at carefully determined intervals and not only act as spacers but take a portion of the shear. The



Cross-section of concrete pole showing forms in place.

space between the outside members is filled with concrete. This forms a web that provides the pole with the necessary rigidity and a desirable resistance to the torsion that would be present due to unequal loading.

Ordinary labor and commonplace equipment are all that is required for the construction of these poles. An additional feature that is attractive is the fact that the poles can be fabricated in the field adjacent to where they are to be erected, thus saving the transportation of unwieldy finished poles, for all poles are unwieldy and many times difficult to transport. The I-beams are placed on a greased steel slide, provided with wooden forms which serve also as spacers between the flanges, and then held rigidly by means of clamps. This is indicated in the accompanying illustration. For the upper few feet where the taper throws the side members so close together chambered forms are not used, the concrete being allowed to fill out flush with the outer edges of the flanges.

# IDEAS FOR THE CONTRACTOR

## Electrical Estimating for the Contractor—XV

### Use of Screw Conveyors, Flight Conveyors, Belt Conveyors Considered and Estimating Methods Outlined

By J. R. WILSON\*, Quality Electric Works, Los Angeles.

In addition to the chain type of conveyor considered in the previous article of this series several other types of conveyors designed to meet certain conditions of operation or materials are in general use. Among these may be mentioned flight conveyors, screw conveyors and belt conveyors. As the screw conveyor and the belt conveyor are probably used more than any other types, the present article will give some information pertaining to them.

#### Screw Conveyors

Screw conveyors are divided into several classes and types dependent upon the use to which the conveyor is to be put. The basic design is typical, but

**Horse-Power Required by Caldwell Helicoid Screw Conveyors**  
The following formula will be found useful in ascertaining the horse-power required for Caldwell Helicoid conveyor.  
In all cases in using this formula, figure as the capacity the maximum capacity which the size of conveyor to be used will handle at the speed at which you expect to run the conveyor. See table No. 1. (The formula is conservative, and the running horse-power of the conveyors will probably not be as high as the result obtained from the use of the formula.)  
$$H. P. = \frac{K \cdot C \cdot L}{2,000,000}$$
  
Where:  $K = 12$  for grain,  
25 for lime coal, cement, etc.  
40 for sand, ashes, etc.  
Where:  $C =$  capacity in cubic feet per hour.  
Where:  $L =$  length of conveyor in feet.  
The power required to drive screw conveyors depends upon the specific nature and condition of the material to be handled, and for this reason no formula is entirely satisfactory in all cases.

#### Formula 1.

the size and contour of the blades vary with the conditions of operation. Most screw conveyors are made of steel, galvanized steel, or cast iron, but they are also built of brass, copper, monel metal or aluminum to meet certain conditions prevalent in the fruit packing and chemical industries.

One of the best known types of screw conveyors in general use is the Caldwell Helicoid conveyor. This type is used for the conveying of grain, coal, ashes, cement, sand, liquids, molasses, hot tar, asphalt, sugar, etc. The blades used are specially designed to meet the conditions specified by the users.

Some blades will stir the material and will also cool it, while transporting it between two points. Other types of blades are designed for mixing two or more materials together. These are variously called stirring paddles, mixing paddles, cooling paddles, ribbon conveyors, etc. Table 1 gives capacities of these conveyors and Formula 1 explains how to estimate the horse-power required.

#### Belt Conveyors

The belt conveyor is one of the best known and most useful of conveying devices. It has been generally adopted

as standard for the mechanical conveyance of bulk and package materials, and has an extremely wide range of adaptability. There are several outstanding points which have recommended the belt conveyor for general use, among which are:

1. Large capacity with low power consumption.
2. Low initial cost, in ratio to capacity.
3. Small operating and maintenance cost.
4. Simplicity of construction.
5. Unrivaled dependability.

It is entirely practicable with belt conveyors to handle any materials

plaster, sand, gravel, packages, soil, ores, starch, sugar beets, etc.

Belt conveyors are now being used up to five feet in width, and the tensile strength of the belt is the only limiting factor of possible length. Conveyors 1,000 ft. in length between centers are in successful operation. Satisfactory operation indicates an incline of from 18 to 22 deg. maximum as best practice, dependent upon the size, shape and class of materials to be handled.

It is practicable to run these conveyors at relatively high speed, thereby giving large capacity. The relatively light weight of the device allows the use of long span supports, and the use of comparatively light weight metal or timber trusses.

The three elements of paramount importance in a belt conveyor are:

### Capacities of Caldwell Helicoid Screw Conveyors

The following table of capacities is based on actual tests and upon experience with conveyor installations. The capacities as given are conservative, but in order to obtain them the feed to the conveyor must be regular, and the hangers must not be so large as to obstruct the flow of material more than the ordinary hanger. The capacities are based on the recommended maximum speed of conveyor for each material. Slower speeds will decrease the capacities in proportion.

#### Grain

Size of Helicoid Conveyor	3"	4"	5"	6"	7"	8"	9"	10"	12"	14"	16"
Speed, R. P. M.	200	200	190	180	175	175	170	165	165	160	160
Cu. Ft. per Hr.	34	72	175	243	352	734	910	1205	2180	2935	5110
Bushels per Hr.	27	58	140	195	282	586	728	965	1745	2350	4100

#### Coal

Screenings, or small sized coal, with no lumps larger than 1 inch

*Size of Helicoid Conveyor	7"	8"	9"	10"	12"	14"	16"
Speed, R. P. M.	110	105	100	95	90	85	80
Cu. Ft. per Hr.	269	544	650	838	1460	1905	3260
Tons—(2000 lbs.) per Hr.	6.7	13.6	16.3	20.9	36.5	47.5	79.0

\*Small sizes of Helicoid conveyor not recommended for handling coal.

#### Cement

Size of Helicoid Conveyor	6"	7"	8"	9"	10"	12"	14"	16"
Speed, R. P. M.	125	115	110	100	100	90	90	85
Cu. Ft. per Hr.	167	233	468	541	725	1210	1625	2730
Barrels per Hr.	42	58	117	135	181	303	408	683

It is strongly recommended that wherever possible, conveyors handling gritty or abrasive materials be much larger than the size determined from the preceding tables. The additional life obtained will more than pay for the slight additional cost.

The size of conveyors selected for handling material containing lumps should of course be governed by the size of the largest lumps rather than the required capacity.

Where possible, use low speeds and large conveyors. The preceding speeds are intended as maximum speeds, and for long life of the conveyor should not be exceeded.

Table 1.

which can be loaded upon the conveyor providing the materials do not adhere to the belt. Among the materials which are being successfully handled in numerous plants may be mentioned:

Ashes, brick, bags, cement, chemicals, clay, clinker, coal, coke, crushed stone, lime, flour, grain, fertilizer,

1. The supporting idlers.
2. The belt.
3. The drive.

The idlers may be one of several standard designs, depending upon the material to be handled. Plain cylindrical rolls are generally used for transporting packages.

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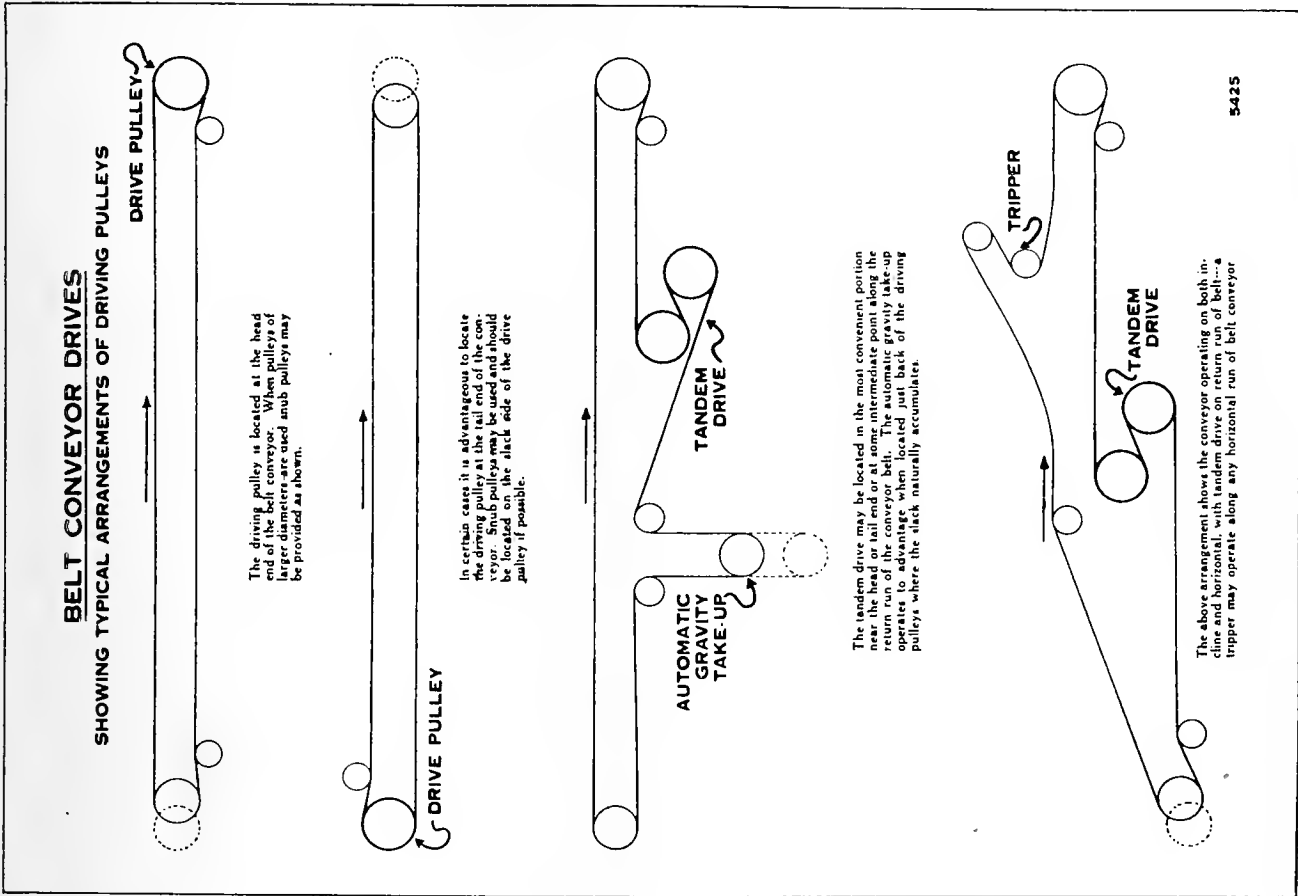


Fig. 2.  
Standard arrangements of belt conveyor driving mechanism.

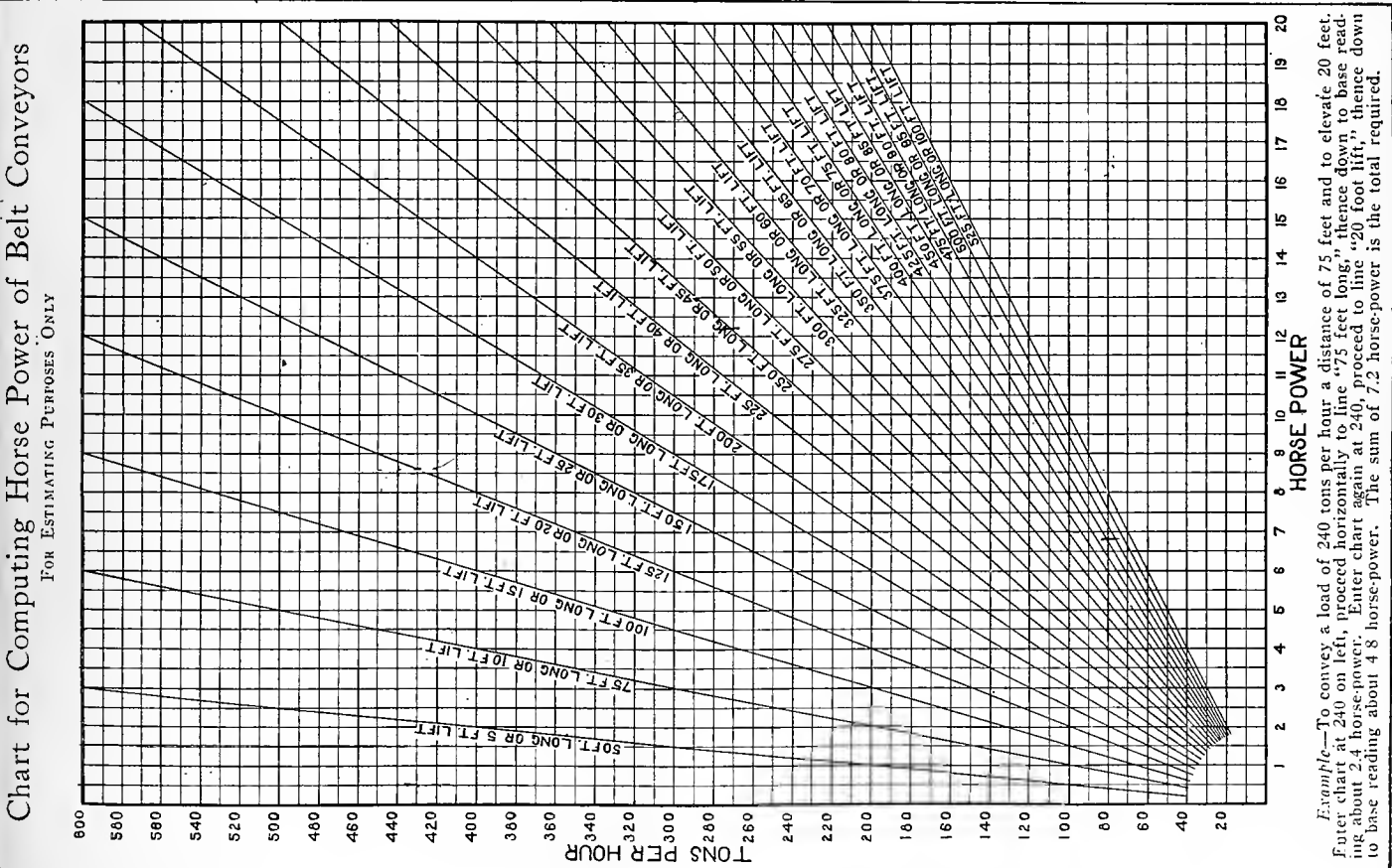


Fig. 1.

Rolls with flared or bell shaped ends are used for giving the edges of the belt a slight "dish," thus forming a trough, thereby increasing the capacity of the belt. Belts of this form are used for carrying earth, sand, and materials of a like nature. Combinations of a central horizontal roll with inclined side rolls, thus deepening the "trough" of the belt, are universally used for handling loose materials.

Conveyor belts are usually of canvas, balata, or rubber, the type being determined by the kind of material to be handled. In the purchase of belts for conveyors the reliability and experience of the manufacturer must be depended upon to recommend the proper type of material to use. The belt should trough by its own weight in order to obtain proper guiding action over the rolls. If too stiff it

belt should be kept clean and if materials have a tendency to stick, a revolving brush (installed near the head pulley) will remove loose material. The belt should be protected from the sun and the elements if maximum life is desired. This can usually be accomplished by the erection of a light wooden housing over the exposed portions of the belt.

The number of plies recommended in standard practice are:

- 12 and 14 in. wide = 3 or 4 ply.
- 16, 18 and 20 in. = 4 or 5 ply.
- 22, 24 and 26 in. = 5 or 6 ply.
- 28 and 30 in. = 6 or 7 ply.
- 32, 34 and 36 in. = 7 or 8 ply.
- 42 and 48 in. = 8 or 9 ply.
- 54 and 69 in. = 9 ply.

The working tension of the belt should not exceed 24-lb. per inch per ply, this being about 1/16 of the breaking strain of a good belt; 36 lb. per inch per ply is the extreme limit to be used and this only on temporary installations. The life of a conveyor belt is dependent upon a great many factors of operation, and no set rule will apply to all cases. An average rule which will give some idea of what a belt should do is as follows:

Assuming one feed point, and 1/8 in. good grade cover, a belt on a conveyor 100 ft. long should handle during its life a tonnage of 500 multiplied by the square of the width in inches, 200 ft. twice as much, etc.

Advisable belt speeds are given in the following table:

CAPACITY TABLE										
Width of Belt in Inches	Cross Section Load in Square Feet	Cubic Feet Per Hour At 100 Feet Per Minute	Cu. Yards Per Hour At 100 Feet Per Minute	Bushels Per Hour At 100 Feet Per Minute	Tons Per Hour at 100 Feet Per Minute					
					Weight of Material in Pounds Per Cu. Ft.					
					25 lbs. Per Cu.Ft.	50 lbs. Per Cu.Ft.	75 lbs. Per Cu.Ft.	100 lbs. Per Cu.Ft.	125 lbs. Per Cu.Ft.	150 lbs. Per Cu.Ft.
12	.067	402	14.9	322.8	5	10	15	20	25	30
14	.094	564	20.9	452.9	7	14	21	28	35	42
16	.12	720	26.7	578.2	9	18	27	36	45	54
18	.17	1020	37.8	819.1	13	26	39	52	65	78
20	.21	1260	46.7	1011.8	16	32	48	64	80	96
22	.25	1500	55.6	1204.5	19	38	57	76	95	114
24	.30	1800	66.7	1445.4	22.5	45	67.5	90	112.5	135
26	.35	2100	77.8	1686.3	26.5	53	79.5	106	132.5	159
28	.40	2400	88.9	1927.2	30	60	90	120	150	180
30	.45	2700	100.	2168.1	34	68	102	136	170	204
32	.52	3120	115.6	2505.4	39	78	117	156	195	234
34	.59	3540	131.1	2842.6	44.5	89	133.5	178	222.5	267
36	.68	4080	151.1	3276.2	51	102	153	204	255	306
38	.76	4560	168.9	3661.7	57	114	171	228	285	342
40	.85	5100	188.9	4095.3	64	128	192	256	320	384
42	.93	5580	206.7	4480.7	70	140	210	280	350	420
44	1.03	6180	228.9	4962.5	77.5	155	232.5	310	387.5	465
46	1.16	6960	257.8	5588.9	87	174	261	348	435	522
48	1.29	7740	286.7	6215.2	97	194	291	388	485	582
50	1.45	8700	322.2	6986.8	109	218	327	436	545	654
54	1.82	10920	404.4	8768.8	136.5	273	409.5	546	682.5	819

NOTE.—The figures given in the above table are based on capacities computed for belt conveyors operating on the horizontal and on an incline up to and including 18 degrees.

NOTE.—The figures given in the above table are based on capacities computed for belt conveyors operating on the horizontal and on an incline up to and including 18 degrees.

Fig. 3.

One of the most important points to be provided for is the proper lubrication of the rolls. Belt roll speed is

Maximum Advisable Belt Speeds							
Width of belt in inches.....	12-16	18-20	22-24	26-30	32-36	38-42	44-54
Speed in feet per minute.....	300	350	400	450	500	550	600

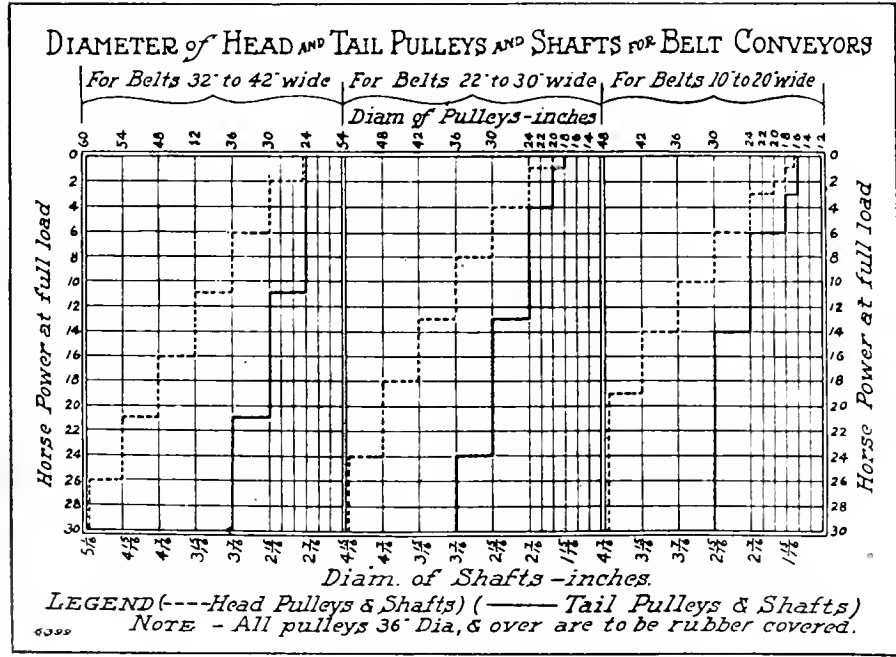


Fig. 4.

Chart giving diameter of head and tail pulleys and shafts for belt conveyors.

usually 200 to 400 r.p.m., and proper lubrication is necessary to reduce wear upon the belt and to decrease power consumption. With a properly designed system of rolls the bearings require attention only at intervals of several months. The labor cost of inspection and maintenance is very low under these conditions.

will ride the inclined side rolls, thus injuring the edges of the belt. If too flexible it will have a tendency to crease longitudinally, thus separating the plies.

It is essential that proper alignment be maintained at all times, the belt running true and centrally along the entire length of the conveyor. The

Fig. 1 is a horsepower chart. Fig. 2 shows standard arrangements of belt conveyor driving mechanism. Fig. 3 gives a capacity table and Fig. 4 shows size of pulleys and shafts for conveyors.

Note: The writer is indebted to Stephens-Adamson Manufacturing Company and Link Belt-Meece & Gottfried Company for the tables accompanying this article.

Booklet Advocates Placing of Cut-Outs Upstairs.—"Can the Electrical Industry Learn Anything from the Plumbing and Hardware Industries?" A well written little pamphlet has been issued by the Mutual Electric & Machine Company, of Detroit, and makes its appeal particularly to electrical contractors. It brings up the methods used by the plumbing and hardware people in educating the public up to finer bathroom installations in place of tin bath tubs, and of demanding better hardware. Advocating the selling of quality installations of electrical wiring, the booklet particularly treats of the selling of outlet boxes of attractive design to be placed on the main floor of a building easily accessible in case of fuse burn-outs.

Insurance Company Advertises for Safe Wiring in National Magazines.—In a full page advertisement in color, appearing in the Saturday Evening Post of Aug. 14, the Insurance Company of North America advocates the consultation of reputable electricians for making all home electrical installations. The "ad" warns against improper or "home-made" installations, neglect of needed repairs, electrical



Questions and Answers on the Code and Safety Orders

Arrangements have been made with Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, to answer through the columns of the Journal of Electricity such questions on the National Electrical Code as are of general interest.

Similar arrangements have been made with George E. Kimball, electrical engineer of the Industrial Accident Commission of the State of California, to answer questions on the Electrical Safety Orders issued by the Commission.

While it is the object of this department to assist in a better understanding of the Code and the Safety Orders, replies given are not to be considered as official interpretations applying in all instances, as some of the rules permit of varying interpretations under different conditions. The questioner should be guided by the inspection department having jurisdiction.

All who are interested are invited to send in their inquiries regarding the National Electrical Code to Claude W. Mitchell, Board of Fire Underwriters of the Pacific, Merchants Exchange Building, San Francisco, Calif., or to the Editor, Journal of Electricity, 883 Mission Street, San Francisco. Questions on the Safety Orders should be sent to George E. Kimball, Industrial Accident Commission, State Building Civic Center, San Francisco, or to the Editor.

Q. On power installations, will current transformers be accepted when isolated by height, instead of enclosed in a metal cabinet. If so, please state where this is noted in the State Code.

A. Instrument transformers operating on circuits of 600 volts or less may be isolated by elevation if located in a place where they are not subject to mechanical injury, or exposed to excessive moisture or similar conditions. Provision is also made for mounting them on the rear of switchboards. Electrical Safety Order 707-10(c), (d) and (e) refers to the installation of instrument transformers used in connection with meter installations. Order 711-12 gives the general requirements for enclosing, guarding and isolation.

Q. Are there any fees for having work inspected by State inspectors?

A. To date the Industrial Accident Commission has never made a charge for an electrical inspection. All requests for inspection and all complaints of unsafe conditions are held until a regular inspection trip is made into the district from which the request is made.

Q. What state rules cover the installation of pole lines by private parties, on their own land?

A. General Order 64, Rules for Overhead Line Construction, issued by the California Railroad Commission. These rules are also adopted by reference in the Electrical Safety Orders under the sections covering services, Order 707, and yard wiring, Order 706-1.

Q. Does an electrical contractor, working outside a city (in the country), need to obtain state inspection on the work installed in a factory? If so, where does he apply for such inspection?

A. An electrical contractor may complete an electrical installation without state inspection. The Industrial Accident Commission holds the employer responsible for an unsafe place of employment and if on inspection at any time unsafe conditions are found

the state inspector will order the employer to correct them.

Q. Does an externally operated switch in an industrial plant have to be of the dead-front type?

A. The so-called "dead front" switch is one of the many forms of safety type switches. They are usually assembled on switchboards and panel boards and not installed as individual units. Their use in industrial plants is very common. All circuit switches and motor starting devices must be of the safety type. See Electrical Safety Orders 709-2(f) and 711-9. For panel boards see order 710-5. The following is a definition taken from page 15 of the Electrical Safety Orders:

**SAFETY TYPE SWITCH** means a switch which is so designed and constructed that no current-carrying parts are normally exposed when the switch is in "off" position or in "on" position, and so designed that the operator can

not come into contact with the current-carrying parts during ordinary operation. This term includes so-called dead-front, guarded, enclosed (externally operated), flush, snap, tumbler, plunger, and similar types of switches, which meet the above requirements and which are rated as approved. Such rating shall cover the complete device, including the enclosing and operating mechanism.

Q. National Electrical Code Rule 3802 calls for the metal used in the construction of sign boxes, etc., to be galvanized, treated with at least three coats of anti-corrosive paint, or otherwise suitably protected from corrosion. Does this mean that galvanized metal must be painted?

A. Metal properly galvanized need not be painted. To comply with requirements of Section 3802a, metal shall be galvanized or treated with at least three coats of anti-corrosive paint, or otherwise suitably protected from corrosion.



What the Red Seal Plan does

The Red Seal Plan was created to give the home builder a positive assurance that his home is adequately wired to meet definite standards of electrical convenience. This plan is backed by the Society for Electrical Development, and any home bearing the Red Seal bears the approval of the electrical interests of this community. Such a home is marked as a home of electrical refinement.

*The Graybar guarantee—under which 60,000 electrical supplies are shipped*

Graybar Electric Company

Everything Electrical

Graybar

THE RED SEAL

The Symbol of Adequate Wiring. Copyright, 1924, by The Society for Electrical Development, Inc.

Who ever heard of a Red Seal?

THERE'S nothing odd or strange about the Red Seal to thousands of folks whose homes have been wired to Red Seal standards.

For the Red Seal is to them the mark of the modern home—completely and properly wired to meet definite and desirable standards. These standards mean that you will have switches and convenience outlets where you need them—no more long unsightly extensions to clutter up the rooms.

Plenty of switches, properly placed—no more stumbling in the dark. Lighting fixtures that put the light just where you need it—no more reading or working in gloom and glare.

If you want to know anything about a Red Seal Home see your electrical contractor or get in touch with the local Electrical League.

GraybaR

ELECTRICAL SUPPLIES—WHOLESALE ONLY

Successor to Western Electric Supply Dept.

Co-operating with the Red Seal plan in excellent fashion is the Graybar Electric Company. Among its many recent excellent advertisements on good wiring and wiring materials this advertisement on the Red Seal plan was run throughout Western newspapers.

# BETTER MERCHANDISING

## Dealer Advertising: How, When, Where?

The small Electrical Store May Use Advertising Successfully If it Does so  
Persistently, Sensibly—and with Courage

By RICHARD E. SMITH, Advertising Manager, Southern California Edison Company

This article starts with the assumption that the electrical dealer recognizes the value of advertising as an integral part of any well organized business. If he is one of those who say, "It does not pay to advertise," he should take the advice of a wise man who said, "If your business is not worth advertising, advertise it for sale."

It is generally known that the small dealer who needs advertising most does not get anywhere near the proportionate return on money spent for advertising as does the large dealer. This is due to two things: First, because the smaller dealer dissipates much of his advertising money on novelties, programs and similar schemes which offer no return and, second, he does not give the thoughtful preparation to advertising that his large competitor demands.

It will be the purpose of this article to take the case of an imaginary electrical dealer whom we shall term the Kingville Electric Company. We shall attempt to lay out an advertising program for him, show him how his money should be spent and give him some simple rules for comprehending the purpose of advertising. Obviously it will be out of the question to discuss the technicalities of this craft, and, as a matter of fact, a knowledge of advertising technique is not particularly necessary to a small dealer, provided he can understand its human aspects.

### Take Kingville, for Instance

We now enter the office of the Kingville Electric Company and ask its manager two pertinent questions. The first is, "Are you ready to advertise?" Nothing can be gained and a great deal may be lost by inviting people to trade at your store before you are ready to serve them. If you advertise "Everything Electrical" and then have to explain to your customer when he comes that the article he wants is not in

stock, you have put him in a frame of mind where he will not want to come back and more than likely he will tell some of his neighbors what he thinks of you.

Before starting to advertise the dealer should ask himself the following

### "Dick" Smith

is qualified to discuss dealer advertising.

For some years he ran an electrical contracting and merchandising establishment of his own.

He has been advertising manager for the Southern California Edison Company for a number of years, planning that company's merchandising advertising in its various campaigns.

He is chairman this year of the Advertising-Publicity Section, P.C.E.A.

He was asked by the California Electragists, Southern Division, to tour with its last Institute, presented to dealers in various towns in the Southern Division, to give them practical, working rules for contractor-dealer advertising.

This article "Dick" Smith wrote from the instructive talk he gave to the electrical contractors and dealers during the Institute classes.

questions: Have I a good store? Is it in a good location? Is it on the right side of the street? Is it stocked with fresh merchandise? Is it manned by people who understand the stock, the customer's needs and the relation of the stock to the customer? Is it well lighted? Is it well ventilated? Is it a place where my wife would want to trade?

It Takes "Abdominal Fortitude?"

The second question is "Have you the courage to advertise?" Of all the essential elements of any business, advertising demands the most courage.

We have to pay rent or lose our lease. We have to pay the jobbers' invoices or lose our credit, but we do not have to advertise and when we have a bad month, there is a tendency

to discontinue our publicity at the very time when we need it most.

One of the first rules of advertising is that it must be persistent. Some magazines insist on a well laid-out campaign or they will not allow advertising to appear on their pages. The reason for this is that their own reputation as a successful advertising medium is at stake and they know that two or three scattering insertions probably will not produce enough business to pay the advertising bill and the magazine will get a black eye. One large magazine will not take an advertising contract for less than thirteen insertions.

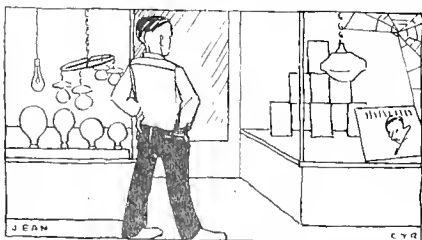
Now that the Kingville Electric Company has assured us that it is ready to advertise and has the courage to carry on, we shall endeavor to map out a sensible program for them.

### How Much Will It Spend?

Before making a move, we must decide on how much money will be available. Small dealers as a rule seem not to understand this and go ahead on a hit-or-miss plan with disastrous results. Every large advertiser gives himself a definite budget for the year's work, generally based on a percentage of his gross business. The small dealer should do the same.

Just what this percentage should be is governed largely by what others are doing. Some manufacturers of specialties allow as much as 10 per cent of their gross receipts for advertising. On the other extreme are grocery stores and similar concerns dealing in staples which spend but 2 per cent. In between we shall find 4 per cent for men's clothing, 5 per cent for shoes, 6 per cent for pianos and radios and so on. No electrical man should expect to get results on less than 3 per cent of his gross receipts and this is the amount we shall put down for the Kingville Electric Company.

We shall set an arbitrary figure of



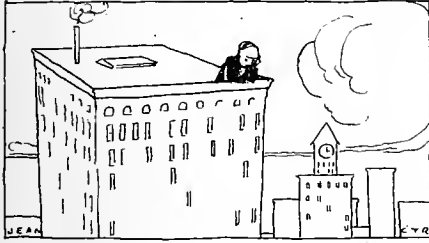
"Let's see, now, it won't do to advertise this here store. One look would send 'em somewhere else."



"Have I courage, or haven't I? That is the question." Not Shakespeare but a dealer looking advertising in the face.

\$30,000 as the annual gross receipts, for it is the dealer doing about this volume of business who is most in need of constructive advice about advertising.

Three per cent of \$30,000 is \$900, the advertising appropriation of the



Get up on the town's skyscraper, if any, and give it the once over. Say to yourself, "Out there are my customers—"

Kingville Electric Company for the year. This will give it \$75 a month or about \$18 a week to tell the story of its goods and services to the public.

#### Where Does the Money Go?

The next question is, how shall we spend this money to reap the greatest benefit? It is apparent that we must be extremely thrifty. If we give \$5 to the Firemen's Ball, \$10 to the Lions' Club picnic, \$20 to the Chamber of Commerce excursion and so on, our \$900 will not last long. If money must be given to these appeals, do not charge it to advertising. If your system of accounting does not provide for charities and donations, these gifts should be taken out of your personal salary, as they are not a fair charge against the operation of your business.

The only place that the Kingville Electric Company can afford to spend its advertising money is in the newspapers, and as there are two papers in Kingville all of this money should be concentrated in one of them, as \$9 a week will not buy much in either paper. If it is necessary to divide the business between the papers, a plan might be worked out whereby the Kingville News would carry it from January to June and the Kingville Courier from July to December.

The better plan, however, is to confine it to one paper and tell the other something like this: "We recognize the value of advertising and we hope by using it constantly to build up our business to the point where we can use both papers. At the present time, if we attempt to use both, we think

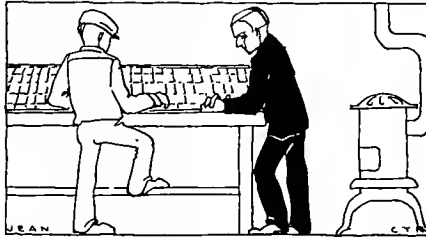
our appropriation of \$75 a month would be 187 in or about 47 in. a week. This will give us approximately a quarter page advertisement once a week, but if this is a daily paper we may choose to use a smaller space two or three times a week. For example, we might have a 2 column x 8 in. advertisement on Monday, a 1 column x 10 in. advertisement on Wednesday and a 2 column x 10 in. advertisement on Friday, thus giving three respectable advertisement during the week and yet using only 46 in. of our space.

The beauty of this budget system is that the advertiser knows exactly how much space he is entitled to and can spend the money with a clear conscience, realizing that he has provided the \$900 to cover the expense for the year. For example, in the case we are considering the Kingville Electric Company may have a special event which will justify a half-page advertisement. This can be done by skipping the following week and then going back to the original schedule.

#### What to Say

Having arranged for this space, the next question is, what are we going to say in it. This leads to a discussion of the preparation of advertising copy which will be difficult in an article of this length. However, we shall make a try at it.

A primary difficulty with the novice is that he persists in writing about an



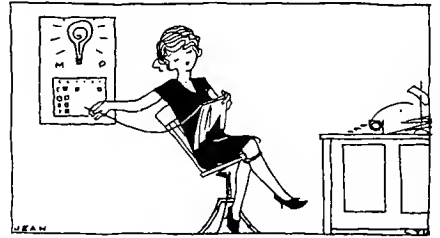
The town printer will help you with advertisements. He knows type and style even if he doesn't know watts and ohms.

article rather than about what it will do. To avoid this tendency, the advertiser should climb to the top of the highest hill or the highest building in his neighborhood and look over the surrounding country. Then let him say to himself, "Out there are the people who will read my advertisement tomorrow. Who are they? What are they doing? How many of them really need a vacuum cleaner? What will a vacuum cleaner do for them? Why should they buy it instead of a clock, a new dress or a cedar chest? If I called on these women individually, what would I tell them about my vacuum cleaner?"

Now we are in the proper mood to sit down at our desk and write an advertisement about a vacuum cleaner which may be expected to bring some results. To describe the revolving brush, the ebony handle and the nickel finish will not do much good. To talk about freedom from backache and having a few hours leisure to go visiting or shopping will put the desired note into the argument.

If an advertising expert were called in by the Kingville Electric Company to suggest a plan for it he automatically would divide the goods and services of the Kingville Electric Company into three classes, and any novice who

follows this rule will find his advertising greatly improved. The first group in this classification is "Unknown and unwanted." The Fiji Islander who has never seen a phonograph knows nothing about it and does not want it. Your prospect who knows nothing



Don't blame your office girl if she takes a stitch in time. Give her nine letters to write instead.

about an electrical refrigerator does not want it and she will not want it until we begin telling her how her domestic economy can be improved by installing this new device.

#### The Three Classes of Merchandise

The second group of articles is labeled, "Half known and half wanted." Into this group we will put the waffle iron, the ironer and the table lamp. Every woman has a half-formed knowledge of these appliances and also a half-formed desire to have them.

The third group contains articles of such common use that they are called "Known and wanted." A good example of this classification is potatoes, for everybody knows about potatoes, everybody wants them and when the supply of potatoes runs low our first impulse is to run to the nearest market and get some more. In this group we will find lamps, fuse plugs, dry cells and similar electrical staples.

It is at once apparent that a very different style of advertising is needed to sell electrical refrigerators than would be employed to market potatoes. Therefore, when writing advertising we first must put the article in its proper group and then use the right sort of argument to promote the sale.

The tendency of amateur advertisers is to make their story so short that it is incomplete. Advertising must be brief and advertisements of less than fifty words are quite common, but careful examination of good advertisements will show that they are always complete. For the beginner it is a good rule to write out the whole story and then condense it into the form of a night letter.



Accidents happen in the best butcher shops. When they do, let the butcher think of you—kindly of course.

#### Let the Newspaperman Help

Unless the advertiser knows a great deal about type, it is better for him to leave the details of arranging the advertisement to the newspaper. Every newspaper of any importance has a service department in which there is a



There are "unknowns" and "half knowns" in appliances. Take the mystery out of them and women will buy.

that results would be disappointing and none of us would be benefited."

Advertising is sold by the column inch, that is to say, one column wide and one inch deep. For a paper like the Kingville News the rate probably would be 40 cents an inch. Therefore

man trained in the art of laying out advertisements. His services are free, yet very few people know about him and still fewer take advantage of his service.

It is particularly desirable to call on this man when starting out to advertise for the first time, as the success of the campaign will be much more certain if it is given a distinct style. This may be accomplished by the arrangement of type, the use of illustrations, the selection of a border, or a combination of all three. Having once selected a suitable style, it is not advisable to change it.

Many good advertisements are spoiled by poor headlines. We should bear in mind that our prospective customer will spend less than thirty minutes in reading the entire paper in which our advertisement appears and we have to compete with the whole gamut of world news to get his attention. The headline must be definite. To say "Announcement," "Special Sale," "Unusual Bargain" or "Just Received from New York" is not enough, for such headlines would apply to lawn mowers, golf sticks, talcum powder and canned peaches as well as to electrical merchandise.

Try to get the whole theme of your advertisement into the headline. Do not try to limit it to four words if seven or eight words are necessary to give a complete message. For instance, if you have just worked out an arrangement with the Royal vacuum cleaner whereby you can sell this for a down payment of \$5 during the month of October, your advertisement should have this headline "\$5 puts a Royal Cleaner in Your Home—October Only." Such a headline catches the attention of every woman who is at all interested in having a cleaner. It tells her the sort of cleaner you are talking about. It explains definitely the amount of money she must spend to get one and it informs her that she must act at once to take advantage of the offer.

Having read this much she will go through the advertisement to get further particulars.

Here is another example. If you are selling electric ranges, do not write a headline like this: "Cook with Electricity." It is much better to say, "An Electric Range Means a Cool Kitchen," or "An Electric Range Actually Saves Food." Such headlines arouse interest to the point where the whole advertisement will be read and a reasonable number of prospects will be influenced to the point of coming to the store for further information. That is all that we can expect any advertising to do for a retail establishment.

### Using the U. S. Mails

So far we have confined this discussion to newspaper advertising, as it was our desire to emphasize the importance of concentration. However, there are other forms of advertising, particularly direct mail, which should not be overlooked. A great deal can be done along these lines without spending very much money. Every envelope that leaves the office should carry some sales message. Even if you send out only ten letters a day, this will amount to three thousand in a year and three thousand messages about your goods and services are not going to do any harm.

It has been the writer's observation that in the typical small establishment there is generally a girl on duty whose business it is to make out bills and answer the telephone. Quite frequently she has enough leisure to do some embroidery or read a magazine. She is not to be blamed for this if her manager has not arranged enough work for her. The point is that she could very well write a few letters each day to the people in your neighborhood whom you would like to have on your books.

What would happen if you made a list of all the butchers within your trading area and wrote a letter something like this:

Dear Sir:

Some day you are going to want an electrician in a hurry and when that time comes, it will pay you to remember the Kingville Electric Company, for when you send a hurry call to us, our response is as prompt as the fire department.

You have in your shop an electric meat cutter, a refrigerator, a cash register and other devices, any one of which may get out of order in the busy part of your day. These electrical appliances are all well made and we hope nothing ever happens to them, but if anything should happen, that is the time for you to use the telephone.

Here is a card with our name and telephone number on it. Tack it on the wall by your telephone so it will be handy when you need it.

Yours truly,

KINGVILLE ELECTRIC COMPANY.

Having written such a letter to the butchers, you could send another one to grocers and then to dry-cleaning plants and then to beauty shops and then to drug stores until without any extra effort or any noticeable expense such messages have gone to most of the business houses in your territory. Nothing remarkable is going to happen as a result of such a campaign and yet by keeping this up for six months or so, there will be established in the minds of your neighborhood that when they want electric service the Kingville Electric Company is the place to get it, and such a reputation, even if it is founded only on advertising, is greatly to be desired.

The title of this article is, "How, When and Where the Electrical Dealer Should Advertise." The answer to the question "how?" is "systematically." The answer to "when" is "all the time." The answer to "where" is "in the newspapers and by mail, concentrated in the area where the dealer operates."

If the Kingville Electric Company adopts this plan and follows it consistently, it will find after a few months that almost without its knowledge new accounts, new inquiries and new customers are coming to the store and that advertising instead of being an expense has proved a definite asset.

The collage features several distinct pieces of electrical advertising:

- Top Left:** A card for "The John Doe" acknowledging payment and promising future service, signed by "The McNally Company".
- Top Center:** A card with the slogan "put it in conduit" and a picture of a conduit.
- Top Right:** A card titled "Concerning C. T. Smallcomb's Business" listing various electrical services and products.
- Center:** A large clipping from "INDUSTRIAL Electric NEWS", published by the Pacific Electric Motor Company. It includes articles on "BROWNING PAPER MOTOR PULLEYS", "NEW LOW PRICES", "PROMPT DELIVERY", and "Good Lighting Makes Food Lasting".
- Bottom Left:** A card with a picture of a ship and the text "The wind serves him who has no destination".
- Bottom Right:** A card for "SPENCER ELECTRIC CO." located at 320 TWELFTH STREET.

Excellent example of well planned electrical contractor-dealer advertising. At the left are three advertising pieces used by McNally Company, Pasadena, an acknowledgment of payment, a reminder on the back of each envelope to use conduit, and a good-will card. At center is reproduced an unusual contractor house organ, being sent to all customers and prospects. At right are other direct-mail pieces of merit.



## "Don't Advertise Unless You Have Plenty of Sand"

"As a piece of advice to dealers who are contemplating a campaign of a nature similar to that we put on for the sale of cookers, I would like to say, 'Don't start unless you have plenty of sand to go through with an expensive advertising campaign,'" writes J. C. Hobrecht, of J. C. Hobrecht Company, electrical dealer of Sacramento whose experience in merchandising has entitled him to a position of authority.

Mr. Hobrecht goes on to say that in the campaign he staged in Sacramento during the month of June, he found that each advertisement only carried the sales for about two days and after spending considerable money in advertising found that a great majority of the public did not know what it was all about. "After spending all this money to tell the public about the cooker," says Mr. Hobrecht, "people would come in, responding to our advertisement which probably they had read from start to finish and ask such silly questions that it would seem they did not understand the very simple language of our advertisements.

Examination of one of the advertisements used by Mr. Hobrecht, reproduced in connection with this article, reveals that it could hardly have been written more simply, and yet, according to Mr. Hobrecht, it seemed to register on about half of those who read it.

Nevertheless, the advertising did bring people to the store, as a summary of the campaign would indicate. The sale opened on June 2, being announced by a full page advertisement in both Sacramento papers. Later in the week a 60-in. advertisement was run in one paper. The following week a 60-in. and a 40-in. advertisement was run in each paper. The third week a 40-in. advertisement in each paper and during the last week of the campaign a 60-in. advertisement in both papers and two 6-in. advertisements on the day before the sale closed, finished the campaign.

In addition to the newspaper advertising 10,000 broadsides were sent out to the power consumers in the city and 5,000 stuffers were used by the power companies and Hobrecht in the mail. The power companies also co-operated by loaning their demonstrator for one day.

The campaign sold 1,500 Everhot cookers. In spite of delays in shipments from the factory, held up en route, losing a number of sales for which they could not make immediate delivery and some "future delivery" sales which were cancelled because of these delays, Mr. Hobrecht says that he feels the sale justified the big advertising expenditure. It brought some 800 new customers to the store and gave the store considerable general publicity.

"We believe campaigns of this kind are good as a stimulator, periodically," concludes Mr. Hobrecht. "Of course there is no profit in them. It is very likely that the 1,500 cookers we sold, if all expenses were charged, would be found to be sold at a loss. However, we have still a fairly healthy demand for these cookers at this time at the standard price of \$11, and it is very likely that we shall finally come out with a profit on the transaction."

New Range Campaign Launched by Puget Sound Company.—Following a successful range campaign just completed, the Puget Sound Power & Light Company has started another range campaign throughout its territory in Washington. Starting in August the campaign is to last two months. Westinghouse ranges are the basis of the drive. A list of prizes is offered both individuals and managers in the con-

test, besides commissions to employees selling the ranges.

El Paso Refrigeration School Course Completed.—A special course in electric refrigeration sales has just been completed at the El Paso Electric Company, El Paso, Texas. The classes were held in the new service building and were conducted by M. H. Spreen of the Kelvinator Corporation, Detroit.

We Have Just Received Another Large Shipment of

# Everhot Electric Cookers

We will continue the unusually low price of

**\$8.95**

Complete with two utensils, plug, cord and tongs.

Shipped anywhere in the state for 25c extra.



You may cook in the Cooker itself which holds 5 quarts or in the two utensils which hold 2 quarts each. Size of cooker is 14 inches high by 10 inches diameter.

You May Pay Only

**\$1.95**

Down and \$2.50 per month for three months

It has taken the whole state by storm. We have been unable to supply the demand—regular shipments are now coming in and we expect to make regular deliveries. Phone or mail orders filled promptly as possible.

## A Welcome Change in Cooking Methods

### What Users Say About Them

One lady reports: "I am cooking the entire meal for a family of six, meat and vegetables at the same time, and after I take them out I cook a pudding without turning on any more current."

Another reports: "My family likes ice cream and frozen dainties, and with the Everhot it is certainly easy to make them. I leave them in just 2½ hours and it freezes them just right."

Still another: "We find the same cuts of meat are cooked very much more tender in the Everhot than they formerly were in the oven."

In the short time since this sale started we have had many reports like the above. Never have we seen anything about which users were so enthusiastic.

Anyone can use it, nothing hard to learn.

### The Greatest Electrical Cooking Device Ever Offered

So easy to use and no work to keep clean. Hot enough to beautifully brown a big roast, yet there is no heat in the kitchen.

#### Also a Big Thermal Jar

You can use Everhot just as you would a vacuum bottle to keep things hot or cold.

#### Ideal for the Picnic Lunch—

Start your Everhot at home, let it do the cooking while you're driving to the picnic place. It will keep hot for hours.

#### Relief from the Hot Kitchen Stove

Everhot will fry steaks or chops, bake cakes or biscuits, roast any kind of meat or fowl, holl or stew meats or vegetables without heating either the cook or the kitchen.

Why stand over a hot stove when you can get relief for so little money?

We Must Raise the Price to \$11.00 on July 1st.



Remember, Sale Lasts Month of June Only.

Advertisement used by J. C. Hobrecht Company of Sacramento in a cooker sale disposing of 1,500 cookers. In spite of simple language used, Mr. Hobrecht says, people only half understood what it was all about, but nevertheless came to the store to find out.

# NEWS OF THE INDUSTRY

## Ryan Laboratory at Stanford Dedicated as Two Million Volt Tests Are Conducted

Two million volts discharge bridged an air gap of 240 inches in a test of the world's highest voltage apparatus and provided the dramatic touch requisite to the formal dedication of the Harris J. Ryan Electrical Laboratory at Stanford University, Friday, Sept. 17. With President C. C. Chesney of the American Institute of Electrical Engineers and a host of other notables in attendance the 2,000,000-volt tests formed a climax to the simple dedicatory exercises in which Dr. Ray Lyman Wilber, president of Stanford University and C. C. Chesney took part. More than 300 people, power company and manufacturers' representatives, university officials, and representatives of the press, witnessed the demonstration of high voltage discharge.

Dr. Ray Lyman Wilber, president, Stanford University, opening the exercises, spoke briefly upon the reasons why the laboratory had been located at Stanford, which he said was in order to further the research of Dr. Ryan in this work which is of great importance to Western development. He spoke of the co-operation between power companies, the General Electric Company and officials of the university in establishing the laboratory and predicted that its presence would be one of the greatest stimuli to students of electricity in the West.

C. C. Chesney, newly elected president of the American Institute of Electrical Engineers, then spoke. He commented on the pleasure afforded him at the convention of the Pacific Coast Division of the A.I.E.E. at Salt Lake City, Utah, in presenting the Edison Medal to Dr. Ryan for "his contribution to the science and art of high tension transmission of power." From Salt Lake, he said, he had come to Stanford to witness the dedication of the laboratory in Dr. Ryan's honor.

Dr. Ryan, acknowledging the honor conferred upon him, expressed his appreciation of the naming of the laboratory for him and then went on to relate to his visitors the purpose of the laboratory and what experiments they would witness that afternoon.

"Sixty per cent of the available water power of the United States is located on the Pacific Coast and back country," Dr. Ryan said. "Sources are usually 100 to 200 miles from their market centers. The growth of the Pacific Coast population makes it a reasonable assumption that by 1935 all of the water powers within the economic reach of the Coast region will have been developed and put to use. The progress of the far west is extraordinary and has been made possible only through economic power

communication. If such progress is not to be reduced greatly after ten years, advances must be made in the technical knowledge of high voltage. It is the manifest duty of all responsible for the progress of the power industry of the far West to co-operate in educating and training men and accomplishing the requisite researches."

Two tests were conducted, each three times in succession, for the full benefit of the large group attending. The first test employed two large plates of galvanized steel, 5 x 8 ft. in size and 4 or 5 inches in thickness, suspended from the high roof of the large hangar-like laboratory. Current to these plates, which were placed 220 in. apart, was gradually brought up to a pressure of 2,000,000 volts. The laboratory being in total darkness Professor Ryan was able to point out the various corona phenomena resulting.

The second series of tests were conducted with two tapered, pointed steel rods,  $\frac{5}{8}$ -in. in diameter, placed at a distance of 240 in., or 20 ft., apart. Again the voltage was raised until the gap was bridged by an arc, ribbon-like in form.

This is the first time voltages of as high as 2,000,000 volts have been used and marks the successful culmination of several years work in the establishment of the Ryan Laboratory. The laboratory is located on ground appropriated for it by the university, south of the campus, between Pine Hill and the Mayfield reservoir. A strip of ground 100 yards wide and a mile and a quarter long is the present area to be used, with provision for a 7-mile strip available when the experiments reach the stage requiring it. The laboratory building is 173 ft. long and 80 ft. wide. The roof is supported by trusses to leave the interior free of supporting columns. The height from the concrete floor to the underside of the trusses is 50 ft. For safety to life and equipment clearances of 20 ft. have been allowed on all sides of the apparatus.

The transformer set consists of six coupled-winding transformers. The coupled winding, developed by A. D. Hendricks, chief of the high voltage laboratories and shops of the General Electric Company, provides two primary and two secondary windings in each transformer, which give more adequate voltage control. A separate voltmeter winding in each transformer makes possible readings with a guaranteed accuracy of within  $\frac{1}{2}$  or 1 per cent, it is claimed.



Dr. Harris J. Ryan (left) at the control board of the new high voltage laboratory recently dedicated in his name at Stanford University. With him is Allan B. Hendricks, consulting engineer of the General Electric Company, designer of the transformers used in the laboratory by which voltages up to 2,000,000 can be produced. At the top of the picture may be seen part of a 2,000,000-volt discharge across a gap of 20 ft.

Two motor generator sets, each with 500 kva. motors connected to a 1,050 kva. sine-wave generator, furnish power to the transformers at 2,300 volts. The motors operate off the 4,000-volt system of the power company.

The large laboratory is provided with sliding doors allowing one whole side of the building to be opened. When closed and lights extinguished the laboratory may be kept in complete darkness. In connection with the laboratory, the building is arranged for sound proof rooms adjoining the laboratory for the switch and the motor generator equipment so that noise from these will not be heard while experiments are being conducted in the main laboratory. A seminar room, dark room, oscillograph room and offices are also part of the laboratory plant so that students do not have to leave it for class or special work in connection with the experiments.

A. D. Hendricks, designer of the transformers and much of the equipment, was present at the dedication. He arrived at Stanford shortly after the transformers were received and remained to assist in the installation and preliminary testing of the apparatus, a period of eight weeks. He left for the East following the successful tests at the dedicatory exercises. Prof. J. S. Carrol, assistant to Dr. Ryan, assisted with the experiments, throwing the switches and attending to the apparatus.

Among other distinguished guests of the day were F. W. Peak, Jr., consulting engineer and expert on lightning study for the General Electric Company; A. G. Wishon, president, San Joaquin Light & Power Corporation, Fresno; Paul M. Downing, vice-president for the Pacific Coast Division, A.I.E.E.; and engineers from nearly all power companies in California.

### Camp Co-operation VI Termed Most Successful Held

The fifth conference of electrical leagues held at Association Island, Henderson Harbor, N. Y., Sept. 1-4, closed with the annual banquet which marked the most successful conference of its kind yet held in the industry.

All parts of the United States and Canada were represented and the number of conferees totaled 282. At this conference 75 electrical leagues were represented.

In addition to the general business program the following special meetings were held—the directors of the society; leagues licensed to operate the Red Seal plan; advisory publicity council; league council; secretary managers of the leagues and individual members of the society.

The business program was well balanced and designed to cover all the important phases of local co-operative business development work. Speakers representing all branches of the industry participated in the discussions. A well organized program of sports and entertainments contributed to the pleasure of the conferees. Some 34 prizes were awarded for golf, tennis, bowling, yachting, bridge, horse-shoe pitching, photography, etc. Many of these prizes were donated by leagues, this being the first conference in which they have participated in this manner.

### Labor Convention Declares for Water and Power Act

Among the resolutions endorsing various measures on the November ballot in California, the California State Federation of Labor in its convention in Oakland, Sept. 22, went on record as favoring and endorsing the Water and Power Act.

Similar action was taken by the labor federation in previous campaigns to pass the \$500,000,000 proposal. Labor councils of various trades, during the last campaign on the Water and Power Act, in 1924, sent out propaganda favoring the act and citing numerous examples of public ownership alleged success in support of the proposed water and power governmental scheme.

### Second Skagit Unit Funds Sought As Plans Are Completed

First steps have been taken by the Seattle, Wash., city council to provide funds for building the second unit of the Skagit River power project, a masonry dam and power house at Diablo Canyon, and an extension of the city's railway to the canyon from its present terminus at the Gorge Creek plant. Chairman Tindall of the council utilities committee has requested T. J. L. Kennedy, corporation counsel, to draw an ordinance providing for a \$3,400,000 bond issue. This will finance the building of the railway extension and dam.

When the dam is completed, the second power house will be installed at the canyon and two additional generators put in the Gorge Creek plant, now housing but two. Six months will be required to complete the railway, when work will start on the dam. J. D. Ross, superintendent of the light department, and J. D. Blackwell, city engineer, are preparing the plans for the dam. Mr. Ross recently announced after drillings to determine the quality of foundation rock beneath the river's bed at the canyon had been made that a perfect granite bed was found. At its narrowest point, the canyon is only 30 ft. wide. The bonds to finance the development will be utility revenue bonds against the earnings of the light department.

Construction of the second unit of the Skagit River hydroelectric project, by the city of Seattle, was brought nearer by the Seattle Board of Public Works on Sept. 20 when that body accepted plans for a dam at Diablo Canyon and issued a call for bids for the construction of a railroad  $4\frac{1}{4}$  miles long from Gorge Creek to Diablo Canyon, the improvement to cost, it is estimated, \$3,400,000.

Plans for the project prepared by F. R. Nicholas, special Skagit engineer, working under the direction of J. D. Ross, superintendent of Seattle's municipal lighting department, provide for the  $4\frac{1}{4}$ -mile railroad, 1,500 ft. of inclined railroad, diamond drilling for a dam site, rip rapping and dam.

Following the completion of this work, a power plant will be built at Diablo Canyon and bids taken for furnishing two 37,500 hp. turbines, complete with transformers and switching equipment. The plant and equipment which will develop 75,000 hp., will cost \$2,689,500. The total cost, including railroad, dam and equipment, is placed

at \$6,089,500, or a fraction in excess of \$80 per horsepower.

Bids for the construction of the railroad will be opened by the board of public works at 10 a.m., Oct. 8, and an award of contract, it is said, will be made immediately thereafter. The existing railroad, extending from Rockport to the Gorge Creek plant is 22 miles long.

The machinery installation of the proposed second unit will not be made for nearly a year, Mr. Ross states. However, specifications for the apparatus needed will be written after the first of the new year.

The new dam at Diablo Canyon will afford 100,000 acre-ft. of stabilized water storage space.

### P. O. Crawford Named Copco Manager Succeding McKee

Perry O. Crawford, who has been connected with the California Oregon Power Company since 1916, was recently elected vice-president and general manager of the company to succeed Paul B. McKee, who has resigned. Mr. Crawford has been vice-president and chief engineer of the company for the past three years.

Mr. Crawford received his technical training at Stanford University, in 1908 receiving an A.B. in electrical engineering. He was then connected with the Northern California Power Company as construction engineer, building several power plants for that company.

A colorful chapter in Mr. Crawford's career came when he left the United States in 1912 to assume duties as assistant engineer on government hydroelectric projects in Afghanistan. For three years he was in charge of the construction of the Jabl-us-siraj power plant.

Upon his return to the United States Mr. Crawford spent six months in research work under Dr. Harris J. Ryan at Stanford University, after which he became connected with the California Oregon Power Company.

Mr. McKee, who resigned from the vice-presidency and general management of the company, has been connected with the company since 1914. From assistant to the president Mr. McKee was made vice-president and general manager in 1919. Mr. McKee has announced no plans, stating merely that he had opened offices at 454 California Street, San Francisco, and will make announcement later.

### Los Angeles Bond Issues Carry by Large Majority

At a recent special election Los Angeles voters approved by a large majority the issuance of \$21,000,000 for water and power facilities. (Journal of Electricity, Aug. 1, 1926, p. 104.)

Of the total amount, \$11,000,000 is to be used by the city's power department to carry out three major expansion programs. These cover:

1. Development of 28,000 hp. additional hydroelectric energy along the Owens River aqueduct.

2. Acquisition of rights-of-way and the construction of tower lines and two new electric stations as a part of a high-voltage transmission system which ultimately will encircle the city.

3. Purchase of privately owned electric distribution lines in recently annexed districts.

## Puget Sound Power Company Farm Booklet Makes Strong Appeal

With remarkable forcefulness the idea that "electricity will do for agriculture what it has done for industry" has been brought out in the booklet entitled, "How to Make More Money on the Farm," issued by the agricultural extension service of the Puget Sound Power & Light Company, Seattle. The booklet, 6 x 9 in., has an attractive front cover which, besides carrying the title and sub-title quoted above, has a picture in three colors symbolical of electrical agriculture. Within are twenty-odd pages of terse, practical suggestions for the profitable utilization of electricity for light, heat and power in farming operations and in the farm home, together with drawings and specifications for the construction of newly developed equipment for the poultryman.

The basic idea of the book as announced on the cover is explained on the first inside page in a series of short paragraphs, in which it is brought out that "American industrial workers (through the application of electrically driven machinery to manufacturing) accomplish more, work shorter hours, receive more pay, save more money and enjoy more of the good things of life than the laboring people of any other country," and that "For agriculture to be as prosperous as industry in America, the farmer should benefit by industrial example and employ machinery and electric power to do the farm work wherever possible."

Following this are several pages of suggested uses in which the story is dramatized through the media of pencil sketches contrasting old methods involving drudgery with modern methods employing electricity. Very little written matter is used in these pages, the message being conveyed by the cleverness of the artist in depicting, for instance, the misery of the man facing a pile of wood with a buck saw as against the apparent happiness of him who has belted a utility motor to a circular saw. Other applications are suggested under such headings as: portable farm motor, water for irrigation and domestic use, better lighting in a cow barn and chicken house, light, heat, power, in dairying, as well as the many uses in the home to bring comfort and leisure to the farmer's wife.

The latter part of the booklet is devoted to drawings of new devices and explanations thereof. These are the Shoup electric oat sprouter, designed by George R. Shoup, poultryman, Western Washington Experiment Station, Puyallup, Wash.; the electric under-heat brooder, developed by Mr. Shoup and George E. Quinan, chief electrical engineer, Puget Sound Power & Light company, Seattle; and the electric hot-bed, explained by F. W. Griffith, owner Puyallup Nursery.

The agricultural extension service of the Puget Sound Power & Light Company is headed by J. C. Scott, agricultural engineer, and is an activity of the commercial department under H. J. Gille, general sales manager. The service has given considerable impetus to the profitable extension of rural lines principally in the western Wash-

ington territory of the company, where it is estimated that the company will build this year 600 miles of rural distribution lines to serve approximately 5,400 new customers outside the corporate limit of towns.

### California Sells Dam Site for Power Development Project

Deed conveying title to 560 acres of a state-owned dam site just east of Folsom Prison in California to the American River Hydro-Electric Company has been signed and delivered to the state treasurer to be held in escrow until the company completes its power and irrigation project, estimated to cost \$7,000,000.

The contract, prepared by the state board of control and approved by the state board of prison directors, provides for the sale of the land under certain conditions to the company for \$150,000 cash and a guarantee to supply the prison with water and power in perpetuity. It also requires the company to start work on the dam site 90 days after the approval of the construction plans, which must be submitted to the director of public works within nine months.

### Modesto Standby Contract Passed Over S. F. Mayor's Veto

Developments during the past fortnight in the campaign to have the city of San Francisco furnish the Modesto Irrigation District with standby electric service from its Hetch Hetchy project included the veto by the mayor of the ordinance making such a contract and its subsequent passage over the veto by the board of supervisors. The contract provides that the city shall furnish Modesto standby service to the extent of 3,000 kw. for an annual charge of \$4,300 and a kw-hr. charge

of 4.7 mills. (Journal of Electricity, Sept. 15, 1926, p. 216.)

In his reasons for the veto San Francisco's mayor took the same stand as City Engineer M. M. O'Shaughnessy, namely that the contract price failed to reimburse the city for the cost of service. He also pointed out that the loss to the city would be between \$39,000 and \$90,000 annually. The mayor further held that no expert advice had been received either as to the actual cost of standby service or to refute the statements of the city engineer.

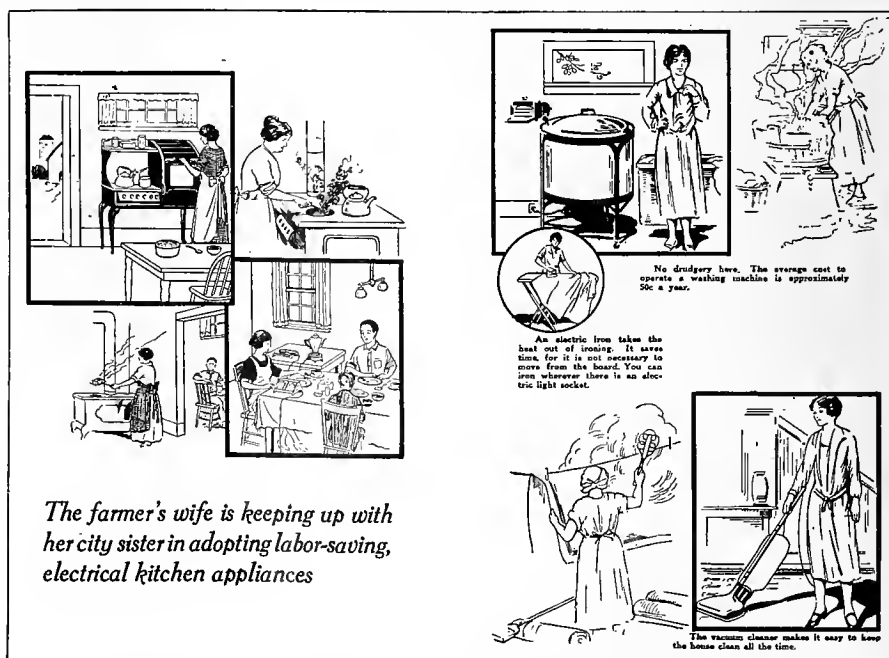
In passing the ordinance ratifying the contract over the veto an amendment calling for the securing of outside engineering advice was voted down by the supervisors.

As this is written there is a possibility that a taxpayer's suit will be instituted against the supervisors to test the legality of the contract.

### New Big Creek Unit Penstock Contracts Let by Edison

Contracts for penstock pipe for the No. 2-A power plant of the Southern California Edison Company's Big Creek-San Joaquin River project have been let. An order for 2,000 tons of banded pipe, 66 in. in diameter by 2½ in. in equivalent thickness has been placed with the Ferrum Company of Poland. An order for 2,000 tons of seamless forged pipe 66 in. in diameter by 3 in. thick has been divided equally between the Midvale Iron & Steel Company and the Bethlehem Steel Company.

In the construction of this penstock which is to be more than a mile in length, forged bends and expansion joints are to be used instead of the ordinary cast or riveted bends or joints. The Kellogg Company is furnishing these fittings. Another unique feature of this installation is the fact that a single line of penstock is to carry the water down the 2,400-ft. drop to the power house where it divides and supplies the two 56,000-hp. units.



A sample of the type of illustration used in the booklet "How to Make More Money on the Farm," issued by the agricultural extension service of the Puget Sound Power & Light Company, Seattle. The clever pictures contrasting the old way of doing with the new way of using electrical labor-saving devices make words practically unnecessary.



### Aylesworth Leaves N.E.L.A. to Head Broadcasting Company

M. H. Aylesworth, managing director of the National Electric Light Association for a number of years, resigned from that organization recently, it was announced, to become president of the National Broadcasting Company, Inc., formed by the Radio Corporation of America to handle a national program of radio broadcasting. The formation of the new company was announced by Owen D. Young and General James G. Harbord, chairman of the board and president, respectively, of the Radio Corporation of America.

The new company has announced the purchase of the station WEAJ from the American Telephone & Telegraph Company for \$1,000,000, which it hopes to make a nucleus of national broadcasting service. Control of the station will be assumed by the new station on Nov. 15 and it is said that the company may lease time from other stations.

In his statement following the selection of Mr. Aylesworth to head the new organization Mr. Young said:

"We have been particularly fortunate in getting Mr. Aylesworth to accept the presidency of the National Broadcasting Company, Inc., and in persuading the N.E.L.A. to let him give up the important work that he has been performing with such signal success for the electrical industry."

Mr. Aylesworth was born in Iowa in 1886, was educated as a lawyer, and at the age of 28 became chairman of the Colorado Public Utilities Commission. He gave up public office to join the Utah Power & Light Company in 1918. Shortly afterward he was named managing director of the National Electric Light Association, taking office the year of the convention at Pasadena, Calif. Mr. Aylesworth has many staunch friends and supporters in the West.

### Foshay Interests Open Security Sales Office in Portland

In connection with expansion program of the W. B. Foshay Company whereby security sales offices are being opened in Portland, Ore., San Francisco, Denver and Boston in addition to the present offices in Minneapolis, St. Paul, New York and Chicago, there is the announcement of the appointment of C. H. Burnworth as sales manager of the security sales offices in Portland. Mr. Burnworth was formerly with the Lumbermen's Trust Company, Portland, Ore. He is well known as an investment expert and has a large clientele on the Pacific Coast.

The Portland, Ore., San Francisco, Denver and Boston offices are being established to provide for sales directly to investors of securities issued or underwritten by the W. B. Foshay Company.

### San Joaquin Company Installs Four Large Transformers

The increasing demand for electrical service in the coast country served by the Midland Counties Public Service Corporation, a subsidiary of the San Joaquin Light & Power Corporation, Fresno, Calif., has resulted in the installation of four large transformers in the Santa Maria substation.

The Santa Maria substation, the terminus of the McKittrick-Santa Maria 110-kv. transmission line, is the largest on the Midland Counties system as are the newly installed transformers. They have a capacity of 7,500 kva., with voltage ratings of 110/72.76/12.5 kv. Ten years ago three transformers with a capacity of 600 kva. handled all the requirements of the Santa Maria district. The new transformers are 20 ft. 4 in. high, 10 ft. 4 in. wide and weigh 36½ tons completely assembled. Specially designed flat cars were necessary in transporting them across the country, and they stood so high that the shipment was routed over eight railroads to avoid tunnels or bridges that would not permit them to pass. Normally three railroads would have been used.

The transformers were placed in service July 11, giving the substation a capacity of about 30,000 hp.

### Democrats Re-nominate Hunt for Arizona Governorship

Governor George W. P. Hunt, ardent advocate of Arizona's rights on the Colorado River, was re-nominated for the sixth time by the Democratic party at the Arizona state primaries. E. S. Clark, attorney of Phoenix, received the Republican nomination.

In a statement issued following the election Governor Hunt reiterated the stand he had previously taken with regard to the development of the Colorado. Among other things, he promised that "this birthright (the power and irrigation potentialities of the Colorado River) shall never be bartered to private corporations." His statement included opposition to the Swing-Johnson bill and the present Colorado River Compact. He also stated that it was his plan to ask the legislature for funds to carry Arizona's fight over its rights on the river to the United States Supreme Court.

The statement of Mr. Clark charges the present muddle with reference to the Colorado to the Democrats and urges immediate development of the river as soon as a satisfactory agreement can be reached between the Colorado Basin states.

### Pacific Company Reduces Rates in Washington

Effecting a saving estimated at \$150,000 annually to its customers on the Yakima-Walla Walla system in the state of Washington, the Pacific Power & Light Company, Portland, has reduced rates on nearly all lighting and power schedules effective Aug. 1. New tariffs were filed reducing residential lighting, combined residential lighting and cooking, commercial lighting, and general power schedules in all towns served by the company to rates comparable with those of towns served by other companies in the surrounding territory.

The reduction was voluntary and was made possible by reason of increased business in the past year combined with improvements in operation producing a saving in operating expenses. The reduction has no bearing on the valuation case in which the company's rate base was contested by the combined cities and towns served by the company in Washington and which is still before the supreme court of the state.

### Many Attend San Francisco's I.E.S. Lighting School

With an enrollment of 45, the five-day lighting school conducted under the auspices of the Illuminating Engineering Society, San Francisco bay cities chapter, completed its course Sept. 25 and elicited requests for further such courses in the future. The school was conducted under the direction of Clark Baker, National Lamp Works, and president of the chapter.

In the enrollment were represented men from contracting companies, jobbing establishments and from the sales forces of the power companies. A quota was assigned to each branch of the industry and practically filled as to classifications. The course was designed by Clark Baker and his associates to present a simple working knowledge of illumination, free from technical or complicated theory.

The course as laid out took up, the first night, terms, definitions and fundamentals of illumination with demonstrations of light control and diffusion. The next meeting, an afternoon session, took up industrial lighting. The third class, the next evening, considered home and store illumination. The fourth class, and afternoon class, brought up diversified cases of special lighting, while the last class, in the evening, took up office lighting and reviewed the course.

Instructors in the course besides Clark Baker were Robert Prussia, Westinghouse Lamp Company; Carl Martin, Benjamin Electric & Manufacturing Company; and Tracy Simpson, Electrical Products Corporation. The classes were held in the Pacific Gas and Electric Company's third floor sales meeting room, at 447 Sutter Street. A \$10 guarantee was returned to all enrolled who attended every class.

### Savage Arms to Manufacture Electric Refrigerators

The Savage Arms Corporation recently announced the appointment of Frank B. Ruoff to the position of sales manager of its newly created electric refrigeration division.

Mr. Ruoff for the past two and a half years has been sales manager of the Eastern sales division of the Nizer Corporation. His studies of the problems confronting ice cream manufacture in connection with the adoption of the iceless cabinet to their business are said to fit him for his new position with the expanding Savage organization.

**Test Borings to Be Made on Proposed Site for Wynooche Project.**—Proposed development of the Wynooche power project by the city of Aberdeen was advanced one step when the city officials of Montesano gave permission to allow test borings on the proposed site of the power and water system, and a price of \$50,000 for the dam site, and \$10 an acre for bottom land was confirmed by Mark Reed, who owns the site. Three sites are now under consideration, and the most favorable location will be the one purchased. It is expected that approximately 700 acres will be flooded in the purchase. J. L. Stannard is consulting engineer for the joint water and hydroelectric project.

## News Briefs

**Utah Town Contemplates Installation of "Whiteway" Lighting.**—The town of Beaver, Utah, is contemplating the installation of a new "whiteway" lighting system in the near future. The new system will extend for five blocks in the business district.

**Seattle Acquires Half Block Additional Area for Substation and Department Store Building.**—The city of Seattle has acquired a half block site on the northwest corner of Third Avenue and Madison Street that will be used as additional area for its electric light department's substation and department store building.

**League Endorses Swing-Johnson Bill.**—The California League of Municipalities at its recent session in Yosemite Park unanimously adopted a resolution endorsing the Swing-Johnson Bill which provides for the construction of the Boulder Canyon dam across the Colorado River. The resolution described the bill as "the most constructive internal improvement measure now pending before Congress."

**New Hearing on Big Springs Electric Company Rate.**—Investigation into the basis for increased rates petitioned for recently by the Big Springs Electric Company serving a number of towns in San Pete County, Utah, has been started in the form of a new hearing on the subject. The basis of depreciation allowed by the Public Utilities Commission in a former ruling was attacked by attorneys for some of the company's patrons, who asked that it be reduced, as much of the property already had been depreciated very largely.

**Cushman Spillway Contract Let.**—Contract for the construction of the spillway for the Cushman power project basin, under development by the city of Tacoma, Wash., the last major feature of the project remaining to be built, has been let to Albertson, Cornell Brothers and Walsh, Tacoma, for \$78,191.50, although two bids were lower. The firm has agreed to complete the contract in 100 days. The spillway of the Cushman basins will be built about a quarter of a mile from the dam at the lowest point in the reservoir rim.

**Yosemite Power Company Proposes \$5,500,000 Power Project.**—Applications for permission to develop a hydroelectric project, the total cost of which will be more than \$5,500,000, has been received by the California division of water rights from the Yosemite Power Company. H. A. Kluegel, San Francisco, has applied on behalf of the company for 175 sec.-ft. and 65,000 acre-ft. per annum from the South and Middle Forks of the Tuolumne River tributary to the Tuolumne River to be diverted for power purposes in three power houses. Total horsepower to be developed by this project is expected to be 66,304.

**California Electric Light and Power Companies' Consumers Increase.**—Electric light and power companies report 1,160,384 consumers in 1925, as against 1,063,169 in 1924, an increase of 97,215, according to the California Railroad Commission.

**City of Tacoma Awards Contract for Electric Cable.**—The city of Tacoma, Wash., has awarded a contract for furnishing electric cable for the Commerce Street underground power installation to the General Electric Company on its bid of \$59,177.83.

**Great Western Power Company Applies for License.**—The Great Western Power Company of San Francisco has applied to the Federal Power Commission for a license covering thirty-eight miles of 220-kv. transmission line between Caribou Point and its Big Bend plant.

**Franchise Granted Puget Sound Company in Lewis County.**—The Lewis County commissioners at Chehalis, Wash., have granted a 25-year franchise to the Puget Sound Power & Light Company for use of right-of-way on the Clinton and White roads in the Adna district.

**Power Project Planned for Merced River in California.**—A proposed hydroelectric power project to develop 13,750 hp. is revealed by the filing with the California Division of Water Rights of an application for permission to divert 2,000 sec.-ft. of water from the Merced River in Mariposa County, Calif. Plans include construction of a dam 80 ft. high, 1,000 ft. long at the crest and 200 ft. at the base. The application was filed by Daniel McFarland of Storrie, and the estimated cost is set at \$400,000.

**Pasadena, Calif., Seeking Bids on Natural Gas Supply for Generation of Electricity.**—Bids are being sought by the city of Pasadena, Calif., for a natural gas supply to generate electricity at the municipal light and power department plant. Under the present contract which the city has with the Los Angeles Gas and Electric Corporation Pasadena enjoys a rate of 19 cents per 1,000 cu.ft. of gas. This, according to B. F. Delanty, general manager of the Municipal Light and Power Department, is equal to oil at \$1 per bbl. Mr. Delanty states that the city is using approximately 2,500,000 cu.ft. of gas a month, the supply coming from the Ventura field.

**Recent Applications Filed with California Division of Water Rights.**—Two applications recently filed with the California Division of Water Rights cover two proposed power projects. One was made by C. S. Wheeler, Wheelerville via Reno, Nev., for 500 sec.-ft. of water from the Truckee River tributary to Pyramid Lake to be diverted for power and domestic purposes, with a development of 11,023 hp. The other was filed by the Pacific Gas and Electric Company which has applied for 9,412 acre-ft. per annum from Deer Creek tributary to the North Fork of the Mokelumne River for power purposes. The estimated cost is set at \$600,000 and 14,170 hp. is to be developed.

**Kennedy Mine Installs Electric Motor.**—The Kennedy Mine on the Mother Lode has installed a 750hp. motor for operation of its equipment at Jackson, Calif., according to press dispatches. Wood is becoming too scarce for profitable firing for steam power and sufficient coal is not available. Previous to the installation the machinery was operated by steam power.

## P.C.E.A. News

### Transportation Section to Hold Meeting Oct. 4-5

The Transportation Section of the Pacific Coast Electrical Association will hold its first meeting in Los Angeles Oct. 4-5 at the office of P. H. Ducker, 1515 East First Street.

In addition to laying out the program for the administrative year, there will be an informal discussion of the various subjects relating to the operation and maintenance of automotive equipment in which section members are interested, some of which will be:

1. Records and Accounting Practice.
2. Lubrication, including air filters, oil filters, etc.
3. Motor vehicle design and construction.
4. Economic life and replacement of motor vehicles.
5. Body construction and design.
6. Automotive repair, public tools and equipment.
7. Painting methods.
8. Power operated labor saving devices.

### Purchasing and Stores Section Decides on Organization

Determination to make meetings of that section two-day affairs, the first for discussion of business, the second to visit plants and storage facilities, as well as organization of the section for the year's work, marked the features of the first meeting of the Purchasing and Stores Section, at the Edison Building, Los Angeles, Aug. 26. C. D. Weiss, San Diego Consolidated Gas & Electric Company, chairman of the section, presided. Mr. Weiss' report of the meeting and work accomplished is as follows:

General discussion of subjects for the year's work resulted in the following:

**Purchasing Policies.**—C. R. Eccles, chairman; J. H. Hunt, T. B. Parks, J. L. Gray.

**Material Control.**—H. O. McKee, chairman; C. A. Kelley, W. deWaard.

**Stores Department.**—Building, facilities, and material handling devices, William Maddock, chairman; D. P. Mason, H. O. McKee.

**Surplus Materials.**—F. W. Smith, chairman; C. R. Eccles, G. C. Robb, R. E. Thompson.

**Obsolescence and Reclamation.**—C. B. Lore, chairman; F. R. Sherwood, T. B. Parks.

**Inventories.**—W. deWaard, chairman; Wm. Maddock, I. B. Walther.

**Stores Organization.**—F. F. Henry, chairman; I. B. Walther, S. E. Hickman, R. E. Thompson.

**Standardization and Simplification Stores Stocks.**—W. J. McCullough, chairman; C. A. Kelly, D. P. Mason.

**Standard Methods Securing Executive Action on Year's Work.**—C. D. Weiss, chairman; C. A. Kelley, H. O. McKee, F. W. Smith, C. R. Eccles.

Analysis of subjects for papers and discussion:

**Purchasing Policies.**—To cover the ethics of purchasing, organization, etc.

**Material Control.**—Control of purchasing, keeping stocks down; ordering.

**Surplus Materials.**—Surplus materials in hands of the different companies represented within the committee to be circularized and arrangements made to publish in the Journal of Electricity as for sale—along similar lines to the publication of anticipated purchases in the California Commercial Digest.

**Inventories.**—To be a review of the committee's report for 1924-1925 and the addition of new developments.

**Stores Organization.**—Review of previous reports of the committee, and the addition of personnel to be covered with a view of enhancing stores workers, securing proper rates of pay that will permit holding of men, rather than have them transfer to other departments, etc.

**Standardization and Simplification of Stocks.**—To include stores ideas on specifications for paint—standard colors; contracting for one or more years with a firm quoting satisfactory prices and material on specifications adopted.

**Standard Methods Securing Executive Action on Year's Work.**—Method for the different companies represented to secure executive action on the work of the committee; executive encouragement, and means for the distribution of the work of the committee to those interested, not only in purchasing and stores departments, but particularly those departments ordering materials.

It was the understanding of the meeting that the committees handling these subjects would review previous reports of the Section—in other words bringing up to date those subjects worthy of consideration each year.

Each sub-committee chairman is to be responsible for securing papers from all members of his committee, and will forward to C. D. Weiss, chairman of the Purchasing and Stores Section, by Nov. 1, 1926, twenty-five copies of each paper, for distribution to all members of the Purchasing and Stores Section on or before Nov. 10, 1926. This arrangement will give each member of the Section an opportunity to study the papers before the next meeting. The use of plain paper and standard outline adopted by the Section was urged.

It was decided that at future meetings a committee on arrangements would be appointed to take care of the entertainment of the members attending meetings, such as visiting factories of products in which they are interested, storerooms, warehouses, etc.

It was decided that meetings shall cover two days, the first day for the discussion of business, and the second for visiting plants, etc.

It was agreed to appoint a permanent secretary for the Section in order that the minutes of all meetings may be available for the use of the Section when in session, the term of office to cover the year's work, and with the appointment of a new secretary all records are to be transferred to the new Section.

The work of the surplus material committee was discussed at great length and it was agreed that lists of surplus material would be obtained from member companies, copies forwarded to all members of our Section, and a copy sent to the Journal of Electricity for publication. The next meeting of the Section is to be held in San Francisco Thursday and Friday, Dec. 2-3, 1926.

The Section extended W. J. McCollough a vote of thanks for providing the meeting place and furnishing a very able stenographer.

## Northwest Electric Light & Power Association

### Further Personnel Appointments Are Announced

Announcing the completion of the rural electric service committee, its chairman, L. A. McArthur, vice-president and general manager, Pacific Power & Light Company, Portland, has announced that a meeting will be held shortly to outline the work for the year. One of the functions of this special committee of the Northwest Electric Light and Power Association is to give every aid to the research work carried on by the state committees on the relation of electricity to agriculture.

The personnel of the committee is as follows: Vice-chairman—George T. Bragg, Pacific Power & Light Company, Portland; H. C. Wells, engineer, Mountain States Power Company, Albany, Ore.; L. R. Sheeley, superintendent, Deschutes Power & Light Company, Bend, Ore.; F. J. Farquhar, general agent, The Washington Water Power Company, Spokane; A. C. McMicken, sales manager, Portland Electric Power Company, Portland; L. R. Grant, assistant sales manager, Central District, Puget Sound Power & Light Company, Seattle; and J. C. Thompson, California Oregon Power Company, Medford, Ore.

P. M. Parry, chairman of the public relations committee for Utah, has appointed the following members of his committee:

H. B. Waters, general manager, Telluride Power Company, Salt Lake City; C. A. Wolfrom, division manager, Utah Power & Light Company, Provo; and A. L. Woodhouse, general manager, Dixie Power Company, St. George.

Members at large of the executive committee of the Engineering Section have been appointed as follows:

J. B. Brokaw, Eastern Oregon Light & Power Company, Baker, Ore.; J. A. Hale, Utah Power & Light Company, Salt Lake City; W. S. Hill, Grays Harbor Railway & Light Company, Aberdeen, Wash.; H. H. Schoolfield, Pacific Power & Light Company, Portland.

### N.E.L.A. Engineering Section to Meet in Chicago Oct. 13-15

The first group meeting of the Engineering Section, N.E.L.A., will be held in Chicago, Oct. 13-15 at the Edgewater Beach Hotel.

The P.C.E.A. Engineering Section will be represented by seven men, thus maintaining the inter-group co-operation that has proved so valuable. Those who will attend are J. G. Rolow, chairman of the section; J. M. Gaylord, M. S. Slaughter, A. J. Hall, I. J. Corbett, C. E. Young and E. J. Crawford.

**Two Convention Chairmen Appointed.**—President D. C. Green has appointed P. M. Parry, Utah Power & Light Company, chairman of the convention program committee, and J. A. Kahn, president of the Capital Electric Company of Salt Lake City, chairman of the convention entertainment committee.

### Women's Committee to Meet Soon to Plan Active Year

The women's committee of the Public Relations Section will be headed this year by Marguerite Butler, director of women's activities, Portland Electric Power Company, Portland, according to announcement by R. M. Boykin, manager central district, Puget Sound Power & Light Company, Seattle, chairman of the Section. Before outlining plans for the year Miss Butler will attend a meeting of the National Women's Committee in Chicago Oct. 4 so that activities in the Northwest division may be made to tie in as far as is practicable with the national program. A meeting of the Northwest committee is scheduled tentatively for Oct. 18 at Portland, when prospective work will be discussed.

The personnel of Miss Butler's committee, in so far as it has been confirmed to date, is as follows: Mrs. Nell Laws, Puget Sound Power & Light Company, Seattle; Stella Dorgan, Mountain States Power Company, Albany, Ore.; Mrs. A. W. Angell, Northwestern Electric Company, Portland; Mrs. E. A. Moyle, Utah Power & Light Company, Salt Lake; Mrs. Gertrude McDevitt, Idaho Power Company, Boise; Mary K. Walsh, The Washington Water Power Company, Spokane; Ellen McCurdy, Pacific Power & Light Company, Walla Walla, Wash.; Esther Miller, Gray's Harbor Railway & Light Company, Aberdeen, Wash.; Anna Gyllenberg, Eastern Oregon Light & Power Company, Baker, Ore.; Martha O. Goldapp, General Electric Company, Portland, and Edna Comstock, Oregon Public Utility Information Bureau, Portland. Additional appointments may be announced later.

**Utah Public Relations Committee Formed.**—Appointment of the public relations committee for Utah for the Northwest Electric Light and Power Association, by P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake, vice-president for Utah, has been announced as follows: E. R. Owen, Utah Power & Light Company, Logan; H. B. Waters, Telluride Power Company, Salt Lake; C. A. Wolfrom, Utah Power & Light Company, Provo; and A. L. Woodhouse, Dixie Power Company, Cedar City.

## A. I. E. E. News

H. H. Schoolfield, chief engineer, Pacific Power & Light Company, Portland, and vice-president for District No. 9, A.I.E.E., has appointed J. E. Yates, assistant chief engineer, Pacific Power & Light Company, secretary for that district, which includes the Northwest states. Mr. Yates is also secretary of the Portland Section.



## News of the Electragists



### Colorado League Makes Budget for Red Seal Promotion

The advisory board of the Electrical League of Colorado has approved a budget calling for the expenditure of \$750 during the next three months in a Red Seal educational campaign directed towards architects, builders and electrical contractors, according to E. A. Scott, chairman of the league's Red Seal committee.

This appropriation will be used in the purchase of display space in local trade publications and likewise for a direct mail campaign in an effort to further acquaint the building industry with the Red Seal movement. In addition, classes of instruction will be held for electrical contractors and their journeymen, it being the thought of the league's advisory board that the industry must be ready to function intelligently prior to the launching of an intensive newspaper advertising campaign for the coming spring building activity.

### Aberdeen Adopts New Electrical Code Ordinance

The city of Aberdeen, Wash., has adopted a new electrical code, designed to simplify the installation and inspection of electrical equipment in the city. The ordinance governs the installation and regulation of electric wiring, apparatus and appliances, fixes charges for issuing permits for installation of electric fixtures, provides penalties for violation of the ordinance, and repeals four previous electrical ordinances.

The office of electrical inspector was created and the chief of the fire department made ex-officio electrical inspector without additional pay. The ordinance consists of 13 articles, and it was drawn after numerous conferences between city officials and electrical men in the city.

F. C. Sherman, proprietor of the Sherman Electric Company of Corning, Calif., was a recent visitor to San Francisco. He paid a visit to old friends when he attended the regular meeting of the San Francisco Electrical Contractors and Dealers Association.

F. W. Buzzell, of the Buzzell Electric Works, San Francisco, recently announced that he had acquired the agency for the Howell line of Red Band motors, as well as the Peerless line of single phase motors, in the bay territory.

**Northwest Inspectors Will Meet in Portland Instead of Longview.**—The second annual convention of the Northwest Association of Electrical Inspectors will be held at the Multnomah Hotel, Portland, Jan. 18-19, 1927, instead of at Longview, Wash., as originally planned. Manufacturers will be invited to present exhibits at the hotel during the two-day convention.

James H. Paige, formerly superintendent for W. E. Langstaff of Pasadena, has purchased the interest of E. J. Field in the Field Electrical Company, 361 E. Street, San Bernardino, and is operating it as the Paige Electric Company.



Fred Elser, Los Angeles electragist, who can be counted on to be present at all conventions of the organization.

D. L. Hofer has opened an electrical shop under the name of Hofer's Electric Shop, at 405 Fifth Street, Marysville, Calif. Mr. Hofer was formerly connected with the Yuba Manufacturing Company and the Hammon Engineering Company, having installed a 3,000-hp. Diesel electric plant in Nome, Alaska, for these companies and operated it for three years. He also installed similar projects in South America. His present shop is an electric shop, specializing in motor winding and electrical contracting.

### Want Manufacturers Displays at Northwest Inspectors Meeting

The Northwest Association of Electrical Inspectors, for its next annual convention, is desirous of displaying in connection with the meetings a number of exhibits at the hotel in which the convention is to be held. An invitation has been extended to all manufacturers to secure space in these exhibit quarters for that meeting, according to F. D. Weber, secretary.

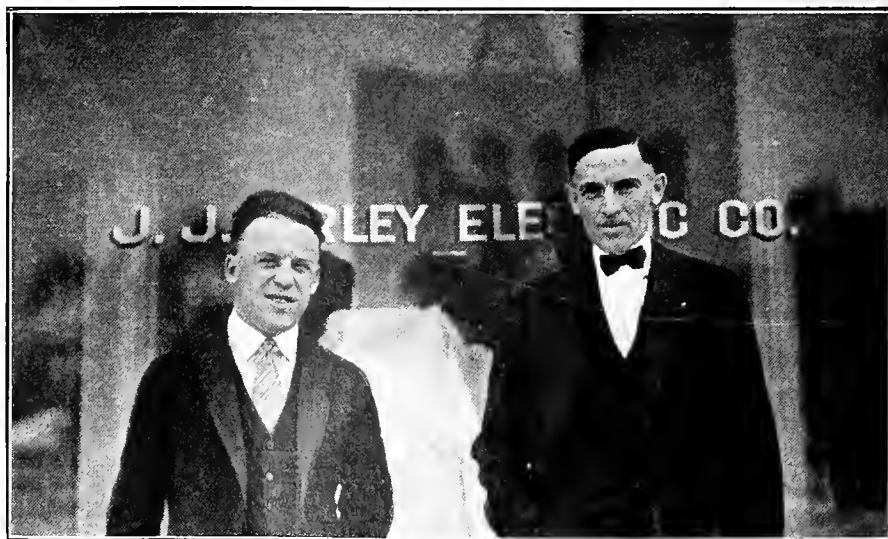
Those desiring space are directed to write to the secretary for information regarding the plan. Something of the nature of display held at Cedar Point for the A. I. E. convention is being planned.

E. C. Headrick, executive committee-man from the mountain division, A.E.I., attended the Electragists convention at Cedar Point, Ohio, Aug. 23-27 as the Denver delegate. Mr. Headrick is prominent in contractor association activities in the mountain region. While East he continued on to Association Island, as representative of the Electrical League of Colorado to the National Electrical League Council, Aug. 30-31, and the meetings at Camp Cooperation VI, Sept. 1-4.

Richard McHugh, Inc., Okanogan, Wash., has the contract to install two 200-hp. pumping-plant units and an auxiliary 15-hp. unit to pump water from the Okanogan River onto the lands of Progressive Flat. The installation will provide auxiliary supply of water for 700 acres of land.

W. B. Holland of the Holland Electric Company, 177 West Center Street, Anaheim, Calif., has remodeled his store so as to double the floor space. Mr. Holland wanted to have a better display of appliance fixtures. The company also does wiring and motor work.

Fred Anderson who, with H. Schfeld, has been operating the Pleasanton Electric Company, Pleasanton, Calif., as a contractor-dealer establishment, recently bought out Mr. Schfeld's interest in the business.



J. J. Farley (left) and Lee C. Baltzelle of the J. J. Farley Electric Company. Mr. Farley has been a member of the executive committee of the Southern Division of the California Electragists, and Mr. Baltzelle has been active in conducting classes in the electragist system of estimating for the members.



## Meetings

### Officers and Directors Elected by Seattle Electric Club

Newly elected officers of the Electric Club of Seattle installed in office Aug. 23 include J. D. Ross, superintendent of Seattle's Municipal Lighting Department, president; R. M. Boykin, general manager, Seattle district, Puget Sound Power & Light Company, vice-president; A. J. Lutz, manager, Pacific States Electric Company, Seattle, second vice-president; D. U. Chamberlin, president of the Globe Electric Company, treasurer, and P. L. Hoadley, representing Stanley & Patterson, Seattle district, executive secretary.

Directors were named as follows: J. J. Hayes, treasurer of the Westinghouse Electric & Manufacturing Company; J. J. Agutter, of the J. J. Agutter Company; J. Harisberger, electrical engineer, Puget Sound Power & Light Company, and Glen Smith, electrical engineer, Seattle Municipal Lighting Department. C. A. ("Joe") Osier has been retained as editor of R.P.M., the Electric Club's official organ, published monthly, and Harry J. Martin, of the National Carbon Company, will retain his position as business manager.

Former officers and directors of the Electric Club included T. S. Wood, representing the Packard Electric Company, president; D. U. Chamberlin, treasurer, and P. L. Hoadley, secretary. The office of first vice-president held by Tom Wood, who succeeded David M. Roderick as president, was not filled. Mr. Roderick resigned last spring to accept a position in New York City as manager for W. P. Fuller & Company. The former directors were Grover C. Burke, City Electric & Fixture Company; A. E. Griswold, A-G Manufacturing Company; R. E. Thatcher, Puget Sound Power & Light Company; George T. Thirsk, electrical engineer; J. R. Wells, Fobes Supply Company, and W. M. Meacham, of Meacham & Babcock, electrical contractors.

Although no definite plans have been developed, the Electric Club is considering an electrical exposition to be held this year under the guidance of the new officers and directors.

### Los Angeles Electric Club Starts Third Bowling Tournament

With a league composed of 28 teams, each representing an electrical company of Los Angeles, the third bowling tournament of the Los Angeles Electric Club started Sept. 29 at Bimini Bowling Bowl. J. A. Sines, Chicago Fuse Manufacturing Company, chairman of the sports committee of the club, is acting as director of the league.

This year's tournament will be larger than that of the past two seasons by several teams. Last year 24 teams competed, while the first year only 10 teams played the tournament, indicating a growing interest in the sport.

Represented this year are teams, grouped in two division of 14 teams each, from the following:

First Division: H. H. Walker Electric Company, Western Light & Fixture Company, Reiman Wholesale Electric Company, Graham Reynolds Electric Company, The Electric Corporation, Brown & Pengilly, Westinghouse Electric & Manufacturing Company, L. A. Railway Company, Manufacturers Agents No. 1, Golden State Electric Company, Los Angeles Department of Electricity, General Electric Company, Electrical Products Corporation, Graybar Electric Company.

Second Division: Pacific States Electric Company, Illinois Electric Company, Safety Electric Products Company, Newbery Electric Corporation, Southern California Edison Company, Los Angeles Gas and Electric Corporation, Los Angeles Department of Water and Power, Southern California Telephone Company, Pacific Electric Railway Company, Manufacturers' Agent No. 2, J. A. Roebbling & Sons Company, Llewellyn Iron Works, Kelman Electric Manufacturing Company, Baker Iron Works.

### COMING EVENTS

Transportation Section, P.C.E.A.—

Meeting in office of P. H. Ducker,  
1515 East First Street, Los Angeles  
Oct. 4-5, 1926

Engineering Section, N.E.L.A.—

First Group Meeting,  
Edgewater Beach Hotel, Chicago  
Oct. 13-15, 1926

Purchasing and Stores Section, Pacific Coast Electrical Association—

San Francisco, Dec. 2-3, 1926

Northwest Association of Electrical Inspectors—

Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 18-19, 1927



A group of officials of the Seattle Electric Club. Back row, left to right—R. M. Boykin, manager central district, Puget Sound Power & Light Company, vice-president; J. D. Ross, superintendent of the Municipal Lighting Department, president; A. J. Lutz, manager, Pacific States Electric Company, second vice-president; and Glen Smith, electrical engineer, Municipal Lighting Department, director, all chosen at the club's recent election. Front row—T. S. Wood, representing the Packard Electric Company, retiring president; Harry J. Martin, of the National Carbon Company, twice president of the club and former director, who will continue as business manager of R.P.M., the club's official organ; P. L. Hoadley, representative of Stanley & Patterson in the Seattle district, re-elected executive secretary; and D. U. Chamberlin, president of the Globe Electric Company, again made treasurer.

## Book Reviews

### ELECTRICAL ENGINEERING

By C. V. Christie. New York, McGraw-Hill Book Company, 1925; 613 pages, 6 x 9 in., cloth, third edition, revised and enlarged, illustrated. Price \$5 net.

This volume is an advanced college text on the theory and operating characteristics of electric circuits and machinery. The earlier chapters are devoted to the basic theory of the electric and magnetic fields and to the calculation of d.c. and a.c. electric circuits.

The subject of d.c. machinery is considered at length, with an extended discussion of the different types of apparatus, their operation and the details of design. A sample calculation for a 250-kw., 250-volt, 400 r.p.m. d.c. generator is included to illustrate the method of design procedure.

Similar consideration follows for both synchronous and asynchronous a.c. machines, transformers, etc., and final chapters discuss the subjects of high-voltage transmission and electrical measurements.

Many years of practical experience in technical instruction and two thorough revisions of the subject matter have developed this book into a most valuable groundwork for collegiate use, particularly in conjunction with parallel courses of instruction in physics, higher mathematics and electrical laboratory work.

R.H.T.

## Personals

Joseph A. Fowler, president of the Association of Electragists, International, is the guest of honor at the annual convention of the California Electragists which will be in session from Oct. 1 to Oct. 3 at Del Monte, Calif. Mr. Fowler is well fitted by character and experience for the prominent po-



JOSEPH A. FOWLER

sition he holds. He is known for his ability to bring disagreeing factions together and to secure their best thought and co-operation. He is president of the Fowler Electric Company of Memphis, Tenn., which he has built up to the point where it is the leading electrical contracting establishment in that city. The concern also does a merchandising business so that Mr. Fowler is conversant with the problems of both of those branches of the industry. During his service of more than fourteen years as executive committeeman Mr. Fowler has made a number of important contributions to the industry's thinking and economic advancement. He was instrumental in securing for electrical contracting a separate classification on liability insurance. His address at the Chattanooga convention of the association and his subsequent work as chairman of the liability insurance committee found quick expression in the relief afforded to the industry. From a policy of no set rates or classification, electrical contracting now is recognized as one of the less hazardous of the building trades. While not the originator of the Data Book, Mr. Fowler was largely responsible for its later growth and development. Furthermore he was one of the first to recognize the need for estimating labor data. His early activities in this connection had much to do with starting the chain of thinking that later led to the present manuals of estimating. Mr. Fowler's leadership as president of the Association of Electragists, International, has been marked by the great advances he has brought about in recognition from the other branches of the electrical industry of the important place of the contractor-dealer in the distribution of electrical service to the public.

C. D. Jacobsen, assistant electrical engineer, Bylesby Engineering and Management Corporation, spent some time in San Diego during September in connection with new electrical installations at Stations "B," "C" and "F" of the San Diego Consolidated Gas and Electric Company.

H. Boyd Brydon, mechanical engineer, Bylesby Engineering and Management Corporation, recently made a short visit to San Diego. Mr. Brydon was accompanied by J. J. Brennan, test engineer, Northern States Power Company, one of the largest Bylesby properties with headquarters in Minneapolis.

Mrs. M. L. Neves has been appointed chairman of the Western States Gas & Electric Company's Women's Club, Stockton, Calif., succeeding Miss Anne Garvin, who has been chairman for the past two years.

S. Waldo Coleman and Samuel H. Taylor, president and secretary, respectively, of the Pacific Coast Electrical Association, will leave Oct. 2 to attend the N.E.L.A. executive committee meeting in Chicago Oct. 8.

Roscoe F. Oakes, vice-president and general manager of the National Carbon Company of San Francisco, recently completed a month's trip in the Pacific Northwest, where he did his first salmon-trolling in Puget Sound waters. Mr. Oakes, accompanied by his wife, attended the Pacific Coast Electrical Jobbers convention in Victoria.

J. F. Orr, sales manager, Idaho Power Company, Boise, accompanied by R. E. Richardson of New York, recently visited the company's Payette office.

J. A. Hale, chief engineer, Utah Power & Light Company, Salt Lake City, was a visitor in Boise, Idaho, a short time ago.

Kinsey Robinson, division engineer of the Payette division, Idaho Power Company, spent a few days in Boise not long ago.

R. B. King, general superintendent, and J. D. Orr, manager, Payette division, Idaho Power Company, Boise, made a trip to Baker, Ore., and adjacent mining territory recently.

J. W. Crowe, division manager at Boise for the Idaho Power Company, paid a short visit to Payette, Idaho, a short while ago.

A. V. Lagomarsino, tenor and C. E. Bates, pianist, of the new business department and bookkeeping department, respectively, of the Los Angeles Gas and Electric Corporation, were among those who took part in the program at a recent meeting of the Los Angeles Electric Club conducted under the auspices of that company.

H. H. Walker, president, California Electragists, W. L. Frost of the Southern California Edison Company; P. H. Booth, of the Edison Electric Appliance Company, and Charles Listenwaller, of Listenwaller & Gough, all of Los Angeles, recently made a trip to San Francisco to attend a meeting of the advisory committee of the California Electrical Bureau. H. H. Courtwright, of the Valley Electrical Supply Company, Fresno, also was present.

C. E. Heise, district manager, Westinghouse Electric & Manufacturing Company, San Francisco, recently departed on an extensive trip East where he will visit East Pittsburgh and other large centers.

S. R. Inch, vice-president of the Electric Bond & Share Company, and formerly vice-president and general manager of the Utah Power & Light Company, spent a week in Salt Lake City, conferring with Utah Power & Light Company officials, during September.

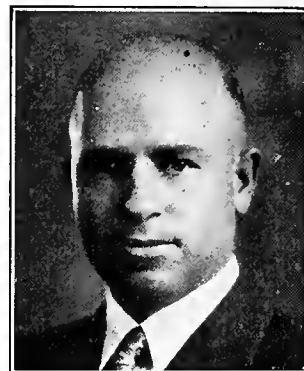
C. C. Chesney, president of the American Institute of Electrical Engineers, addressed the weekly luncheon of the Salt Lake City Chamber of Commerce on Sept. 8. B. C. J. Wheatlake, manager of the Salt Lake City branch of the General Electric Company, presided at the luncheon, which was attended by many delegates to the Pacific Coast convention of the American Institute of Electrical Engineers.

N. H. Callard, Jr., formerly representative of the Westinghouse Electric & Manufacturing Company in Boise, Idaho, has been appointed assistant to G. H. Frobels, central station sales manager of that company, with headquarters in New York City.

W. L. Shay, formerly credit manager of the Myers Electric Company, Los Angeles, has resigned to become the Los Angeles sales manager of the Reiman Wholesale Electric Company.

Newton Graham of the Graham-Reynolds Electric Company, and Harry Harper, Los Angeles manager of the Graybar Electric Company, attended the Jobbers Association convention at Victoria, B. C., Sept. 7-9.

F. J. Rankin, chief engineer, Idaho Power Company, Boise, for many years active in the affairs of the Northwest Electric Light & Power Association, has been appointed chairman of the



F. J. RANKIN

Engineering Section for the year 1926-7. After being graduated in electrical engineering from the University of Kentucky in the class of 1907, he practiced his profession in a number of ways, among which were chief engineer of the Public Utilities Commission of Colorado for four years and one year in private practice. In the summer of 1919 he went to Boise to enter the engineering department of the Idaho Power Company, and in the fall of 1921 was made chief engineer of that company, a position he has held ever since. He is an active member of the American Institute of Electrical Engineers and of the National Electric Light Association, having been one of the engineer members of the range survey committee of the latter that conducted the tests on ranges in Boise and Spokane, embodied in the final report of that committee at Atlantic City last May.

Major Howard Sharp Bennion, former assistant chief engineer of the Federal Power Commission, has been appointed director of engineering at N.E.L.A. headquarters to succeed Col. William Kelly. Colonel Kelly has resigned his work with the National Electric Light Association to become vice-president of the Buffalo, Niagara & Eastern Power Corporation in charge of engineering and operation. Major Bennion was born at Vernon, Utah, in 1889. He attended grammar and high school at that place and Salt Lake City, entering the U. S. Military Academy at West Point in March, 1908. He graduated from the Military Academy in



MAJOR HOWARD SHARP BENNION

June, 1912, at the head of his class; he graduated also at the head of his class from the Army Engineer School at Washington in April, 1915. After six months service in Texas he served one field season in the Philippine Islands as assistant and one season in charge of the military survey in Luzon. With America's entry into the World War in 1917, he was ordered from the Philippines to France in command of the First Battalion, Second Engineers, of the Second Division. Arrived in France he promptly was relieved of this assignment and placed in charge of the newly constituted camouflage service. He held that job until after the armistice and for his work in the camouflage section subsequently received the Distinguished Service Medal. For his work as district engineer in charge of roads in the battle areas after the armistice Major Bennion was honored by France with membership in the Legion of Honor. After his return from France at the end of 1919 he was placed in charge of the division of engineer supplies in the office of the director of sales of the War Department. When the Federal Power Commission was organized in 1920 he was appointed assistant chief engineer, a position he held for four years. In September, 1924, he was appointed district engineer of the Fourth Mississippi River District at New Orleans in charge of levee construction and bank protection works on the Mississippi from Vicksburg to the Head of the Passes, and in charge of levee construction on the Atchafaluga. Major Bennion has resigned from that work to join the N.E.L.A. staff.

Ray Hammatt, who has had charge of collections in Contra Costa County, Calif., for the Great Western Power Company for the past five years, has been made district agent.

C. E. Patterson, vice-president of the General Electric Company in charge of merchandising, with headquarters in Bridgeport, Conn., recently spent some time in San Francisco. Mr. Patterson has been making a tour of the Pacific Coast, accompanied by Julius Tuteur, president, Electric Vacuum Cleaner Company. A number of dinners and luncheons were tendered Mr. Patterson during his visit to San Francisco at which he was given an opportunity to meet with and discuss merchandising problems before a large number of people interested in this phase of the industry.

J. H. Anderton, of Thebo, Starr & Anderton, San Francisco, who has been in Japan for the past three months on company business, has returned to that city.

T. L. Rosenberg, of the Rosenberg Motor Company, Oakland, Calif., was congratulated by his fellow members of the Oakland Electric Club at a recent meeting upon having been elected a member of the Hole in One Club of that city.

Louis F. Leurey, consulting electrical engineer, San Francisco, recently appeared as a witness for the Pacific Gas and Electric Company at the hearing being held before the California Railroad Commission in connection with the valuation of that company's distribution system in San Francisco.

Edwin Bowen and G. D. Smith, both steam engineers for the Los Angeles Gas and Electric Corporation, have been retired to enjoy the pensions to which their years of service entitle them. Mr. Bowen retires after sixteen years of continuous service while Mr. Smith has been with the corporation for eighteen years.

Paul R. Prietsch, assistant to R. W. Murphy, Pacific Coast manager, Westinghouse Lamp Company, San Francisco, recently paid a two weeks' visit to southern California.

Eugene Logan, formerly of the engineering department of The Washington Water Power Company, Spokane, now consulting civil engineer of that city, recently has been retained to survey the Columbia Basin project in Washington.

M. Ready and M. J. Selaya of the Babcock & Wilcox Company have been conducting extensive boiler investigations in Southern California and at the present time are with the San Diego Consolidated Gas & Electric Company.

George J. Krap and H. T. Woodward of the Southern California Edison Company, Long Beach, were visitors at San Diego not long ago and looked over the new installations at Station "B" of the San Diego Consolidated Gas & Electric Company.

William Channon of the Permutit Company, New York City, was recently in San Diego, as also were D. P. Vail, manager, C. C. Moore Company of Los Angeles, and F. C. Church, Fidelity & Casualty Company of Los Angeles.

John V. Strange, formerly assistant general manager, Pacific Power & Light Company, Portland, who is now operating manager of Carolina Power & Light Company, Raleigh, N. C., was a recent visitor in Portland.

J. F. Pollard, vice-president and general manager, Coast Valleys Gas & Electric Company, Salinas, Calif., paid a short visit to San Francisco not long ago.

L. M. Cargo, manager of the Denver office of the Westinghouse Electric & Manufacturing Company, recently spent two weeks covering the Salt Lake City territory of the Westinghouse company.

Henry W. Burritt, formerly tax attorney for Henry Ford and later president of the Gray Motor Company, Detroit, is the new president and general manager of the Leonard refrigerator Company, Grand Rapids, Mich.

D. A. Smith of the Graham-Reynolds Electric Company, Los Angeles, has been made purchasing agent of that organization.

Ray S. Quick, formerly sales engineer with the Pelton Water Wheel Company, San Francisco, recently has received an appointment to the engineering staff of that company. Following his graduation from the University of California, class of '16, with the degree of B.S. and E.E., Mr. Quick became a Research Fellow in the Engineering Experiment Station at the University of Illinois, completing a year's work in that institution and receiving his M.S. degree. During his undergraduate period Mr. Quick was elected to Tau Beta Pi and Sigma X membership. He served two years in the World War as a lieutenant in the Signal Corps, U.S.A., and following that he became associated with the Pelton Water Wheel Company. Mr. Quick is an active member in the American Society of Mechanical Engineers, the San Francisco Engineers' Club, and the Pacific Coast Electrical Association. During recent committee



RAY S. QUICK

membership in the latter organization he has done notable work in a study of comparison and limitations of existing water hammer formulas.

## Obituary

Hyrum C. Johanson of Logan, Utah, salesman for the Intermountain Electric Company of Salt Lake City, was killed in an automobile accident Sept. 1.

Bertram J. Noll, Tacoma, Wash., electrical contractor, died in that city on July 30, at the age of 51. He was associated in contracting work with his son, Bertram F.

## TRADE NOTES

The Monarch Fuse Company, Inc., of Jamestown, N. Y., has announced the purchase of the Kilark Electrical Manufacturing Company, makers of the Kilark Non-refillable Fuse, located at St. Louis, Mo. On the Pacific Coast this company is represented by the Electrical Specialties Company of San Francisco, Los Angeles and Seattle.

C. J. Thelan, formerly connected with the Wholesale Electric Company, has just opened an establishment for jobbing and wholesale business in electrical supplies and fixtures under the name of the Thelan Electric Supply Company, located at 1066 Howard Street, San Francisco. Ample storage and service facilities have been provided in the new enterprise for the many lines carried, it was announced by Mr. Thelan.

Copeland Products, Inc., Detroit, through George W. Mason, vice-president and general manager, has announced that it estimates its business in electrical refrigerators for 1927 will quadruple that of 1926 and already it is laying plans for increasing production facilities. Additional modern equipment is being installed and the manufacture and assembling is being put on a progressive assembly basis which has been common practice in the automobile business for many years. The company recently brought out a new model electric refrigerator which sells for \$215.

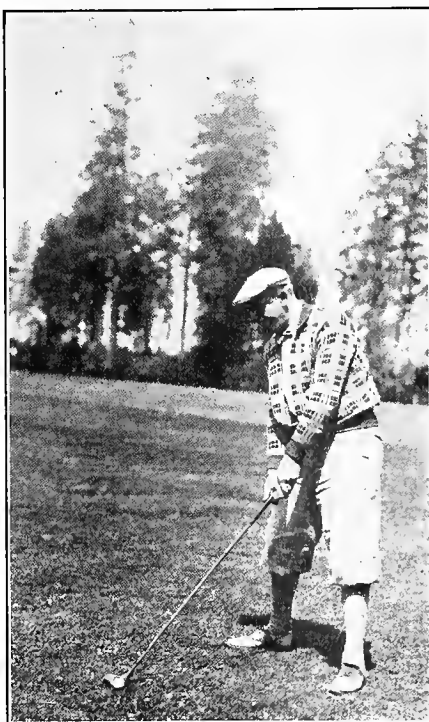
Rome Manufacturing Company, Rome, N. Y., is distributing a pamphlet on the Rome portable electric heater, which it designates "The aristocrat of the electric heater family." Special emphasis is laid on the quality of the standard heating element, which will be 600 watts, although 1,000-watt elements can be furnished when desired. The heater is made from brass and copper, is guaranteed perfect in workmanship, efficient in performance, and is listed at \$12.50 with 1,000-watt element, nickel plated \$13.50.

The Commercial Truck Company, Philadelphia, has purchased the assets, including machinery, equipment, trucks completed or partly completed, parts, drawings, patterns, dies, etc., and all patents of the Electruck Corporation, manufacturers of electric street trucks, known under the trade name of the Electruck. Inquiries relative to the Electruck should be addressed to the Commercial Truck Company, 300 Hunting Park Avenue, Philadelphia, Pa.

Standard Electric Stove Company, Toledo, recently has added to its line a three-burner hot plate measuring 27 in. x 9 in., model No. 51. Each burner is 800 watt controlled by three-heat switch. It is made in black japan finish and retails for \$18.

Bakelite Corporation, New York, has issued an attractive broadside emphasizing the permanent beauty, strength and endurance of its product and the ability of Bakelite to resist heat, electricity, chemicals and water. The illustrations are particularly pleasing.

Artistic Lighting Equipment Association is the new name of The National Council of Lighting Fixture Manufacturers chosen at its recent annual meeting. The slogan, "Decorate with Artistic Lighting Equipment" was adopted for general use. New by-laws and a code of ethics and fair trade practice were adopted, and the recommended four-year co-operative advertising and merchandising program unanimously approved.



The smoothness of the grass and the delicate tracery of the trees serve as a soothing background to the riotous blazer—and the man who coined that word "blazer" knew whereof he spoke—adorning the intent golfer in the foreground. The keen observer will note that the dashing little squares of color in the upper part of the costume are matched in more subdued fashion in the "plus fours" while the heraldic devices on the socks probably were taken from the family coat of arms. Solomon in all his glory had nothing on Lewis A. Lewis, sales manager of The Washington Water Power Company.

A. J. Lindemann & Hoverson Company, Milwaukee, Wis., is placing on the market its new L. & H. Electrics air heaters for use in the home, in offices, theatres, box offices and the like. Each is made of steel with cast-iron legs and attractively finished in antique brass. These heaters are made in two sizes, a 16-in. and a 28-in. The smaller type is made for 115-125 volts and can be had in 1,000, 2,000 and 3,000-watt sizes. The same sizes are built for 220-230 volts also for these three wattages. The large air heaters are built for 220-230 volts only, made to consume either 4,000, 5,000 or 6,000 watts.

The Ohio Brass Company, Mansfield, Ohio, now is distributing its new No. 20 O-B general catalog. This book of 945 pages, exceeding the previous edition by 175 pages, includes complete listing of all O-B porcelain insulators, trolley and line materials, rail bonds, car equipment and mining materials. It is logically divided and thumb-indexed for the well defined classes of products of this company. In addition to descriptive and listing information, there are many helpful suggestions for the man concerned with the installation of these products. All of the material pertaining to porcelain insulators and hardware, and other pertinent data, 472 pages, also are being distributed in a separate binding, known as the Insulator Section. This special binding is for the convenience of those interested in the high-tension materials only. The books are indexed carefully and convenient cross-references are plentiful.

The Plibrico Jointless Firebrick Company, Chicago, is manufacturing Plibrico stucco, a new refractory used for the maintenance of brick or monolithic furnace walls and of arches. It is applied to the wall or arch as often as the boiler comes off the line, replacing that part of the furnace wall that has been eaten away during the last service period. Plibrico stucco can be used only where very high furnace temperatures are obtained.

The Liberty Gauge & Instrument Company, Cleveland, has added to its line of electrical appliances the Liberty heat-controlled automatic iron. This iron has an exceedingly accurate thermostat of special design and construction which maintains a constant, even, ironing temperature, according to the manufacturer. The thermostat is governed only by the temperature at the sole plate. When standing on its heel-rest the temperature is maintained within 10 deg. Other features claimed for the Liberty automatic are its cool handle, its convenient heel-rest, its tapered point and its proper distribution of weight and perfect balance. The thermostat, element and terminal prongs are assembled as an integral unit. Both sole and pressure plates are cast in virgin metal. Cover, heel-rest and guard are 18-gage cold-rolled steel; highly nicked with ebony finished wood handle; capacity 660 watts, 110 volts, a.c. current only; weight, 6 lb.; intended retail price, \$7.35.

George W. Dunham Corporation, Utica, N. Y., has announced through Frank E. Cronan, its Pacific Coast representative, that the Fobes Supply Company of Seattle, Wash., and Portland, Ore., has been appointed distributors of the Whirldry washing machine for those territories.

The Cutter Company, Philadelphia, has issued an interesting little booklet, "This Is the Age of the Specialist," dealing with circuit breakers and circuit breaker problems.

Edison Electric Appliance Company, Inc., Chicago, has published a catalog supplement covering a group of new Hotpoint electric appliances just announced to the trade. These include new paneled eight-cup urn, new five-cup paneled percolator, popular-priced waffle iron, small round tray, and combination of waffle iron and tray, at \$31, \$24.25, \$10.50, \$1.35 and \$11.50, respectively, list.

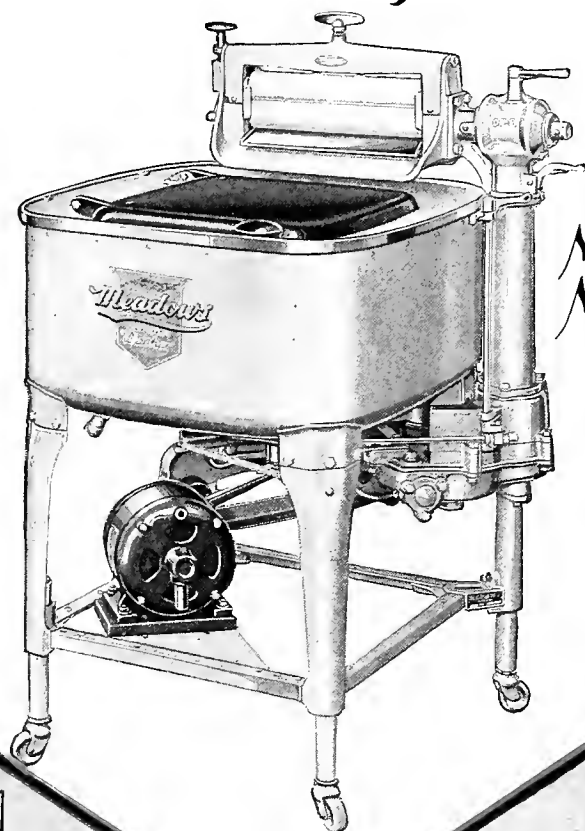


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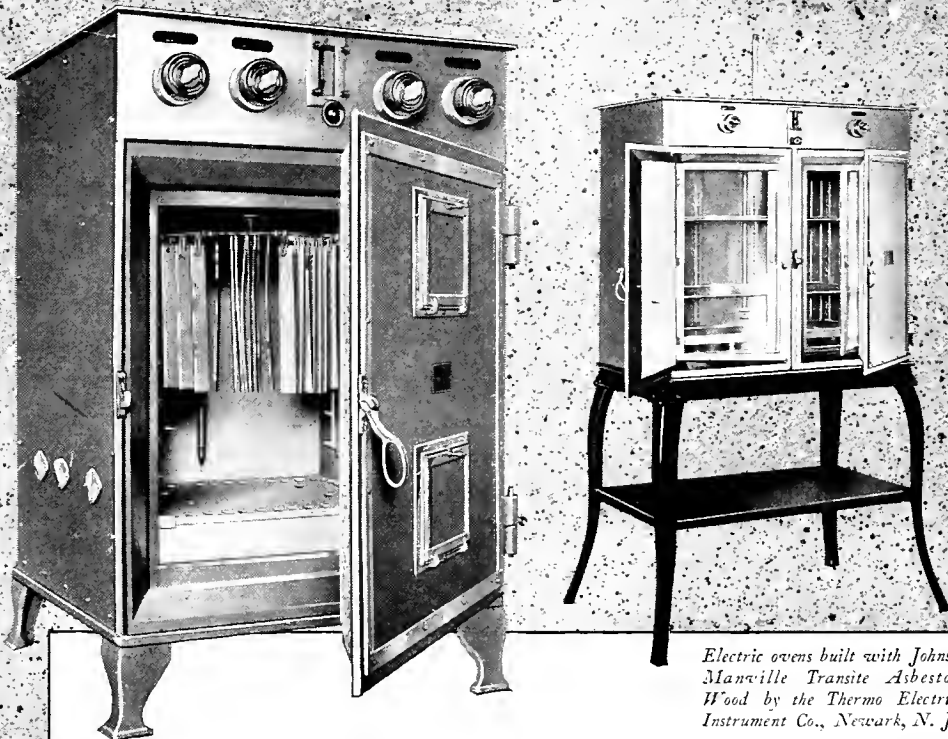
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## Refrigeration Survey

BECAUSE considerably more time than was anticipated has been required for the analysis of the reports on the status of electric refrigeration in the West, it has been impossible to include this material in this issue of the Journal of Electricity. McGraw-Hill editors covered the important cities throughout the country to get a true picture of the refrigeration situation. Conditions nationally will be discussed in an early issue of Electrical World while a special analysis of the Western situation will be presented in the next issue of the Journal of Electricity. Every phase of the subject will be considered from the standpoint of manufacturer, distributor, dealer and central station. This article should be of the utmost interest to practically every man and woman in the industry on account of the extreme importance of the subject matter.

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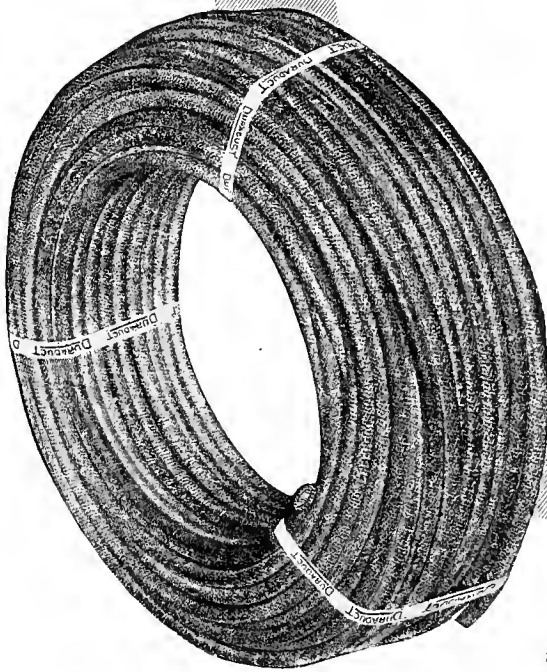
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# EDITORIAL

## *A Sales Job That Demands Teamwork*

NO business can show greater progress than that made by the electrical industry in the solution of its engineering, financing, accounting and public relations problems. Many—and here one is tempted to say all—can show far greater strides in the solution of their marketing and sales problems. Few gatherings of electrical men have been held this year in which emphasis has not been placed upon the importance of better sales methods for both electrical products and electrical service; few meetings have been held in which the weaknesses of the present sales structure have not been pointed out and constructive suggestions offered for its improvement.

WERE this selling problem one of load-building alone, then the responsibility would lie largely with the central station because its chief interest is in the disposal of increasing quantities of kilowatt-hours. However, the ramifications of the problem include the sale of wiring installations which will permit of the maximum convenient use of the services electricity provides; hence the contractor has a vital interest. It includes the sale of the appliances, devices and equipment for the utilization of electrical energy; hence the dealer becomes immediately an important link in the chain. Because the jobber is a necessary factor in the distribution scheme he, too, is interested; and because the manufacturer produces both the machinery for the gen-

eration of energy and the equipment and devices for its utilization he, also, is vitally concerned.

PRIMARILY, though, the success or failure of the selling program will have its greatest effect upon the power companies and from them should come guidance and leadership. The policy pursued by the central stations will determine the efficacy of the program. If the best use is made of the existing means for load-building through the greater distribution of energy-consuming appliances and devices, and if a plan is devised that will encourage the maximum number of outlets to participate, then it is conceivable that progress will be made.

PERHAPS it is a Utopian dream to hope for a plan which will center around a spirit of teamwork and co-operation rather than around a policy which will permit destructive competition between the distribution outlets. It is obligatory for the central stations to see that all elements work in perfect harmony rather than to permit dissension to enter the ranks of the industry.

WITH but slightly more than ten per cent of the possible field electrified, the industry is confronted with an enormous sales task. Even with every branch working in perfect unanimity and at the maximum pitch the selling job is big enough to furnish work for all for many years to come.

### The Industry Is Offered a Unique Opportunity

**A** SOUND merchandising policy is the solution of the public relations problem," said Robert F. Pack, president of the National Electric Light Association, in an address before the Northwest Electric Light & Power Association at Spokane, Wash., last June.

With that as his theme, A. N. Robertson, electragist of Santa Ana, Calif., has written the report of the Merchandising Section of the California Electragists, presented elsewhere in this issue.

Naturally, the report represents the views of his committee and undoubtedly there will come objections of one kind or another from the other branches of the industry. Those objections, however, are relatively insignificant as compared to the larger issue involved, namely, that Mr. Robertson's report offers a basis upon which negotiations between central stations, manufacturers, jobbers and contractor-dealers may be commenced for the purpose of arriving at a merchandising policy that will fulfill the requirements set forth by Mr. Pack.

The Electragists have taken the initiative. "Barkis is willin'". What is the next step? Joseph Fowler, president of the Electragists International, furnished the answer when he spoke of the forthcoming meeting between all the electrical interests in New York for the purpose of discussing the all-metal code in house-wiring. At that meeting there will be present a chairman and representatives of all branches of the industry, namely, central stations, manufacturers, jobbers and contractor-dealers. They will thrash out point by point from a previously prepared agenda the fundamentals involved in the problem, and, we hope, arrive at a conclusion that will become a definite policy of the industry as a whole.

What better procedure could be adopted by the industry in California toward the end that a sound merchandising policy may be established within the state?

Now that the foundation for a better merchandising policy has been laid, it is to be hoped that the matter will be followed through vigorously, and that the conferees will approach the question with open minds. Obviously the conclusions will consist of a series of compromises arrived at on a reasonable give-and-take basis by all parties concerned. The result will be far-reaching. The opportunity for welding the industry into a harmonious whole is unique. May the industry be big enough to grasp the opportunity.

### Commercial Section Merits Executive Support

**I**N following the program of the Commercial National Section in concentrating committee work on specific tasks and eliminating those committees which have neither tasks nor meaning the Commercial Section of the Pacific Coast Electrical Association has taken a forward step. As set down on another page of this issue the executive committee of the section has laid out a splendid pro-

gram for the committees for the coming year. Every task is specific and at the same time one that will have a definite bearing upon the commercial progress of the industry.

One of the ailments of the section in the past and one of which the members directing the section's work have been thoroughly cognizant has been the lack of executive support. If not entirely apathetic the interest of executives has been only lukewarm. The program outlined by the section should do much toward changing this condition. If the program is followed out and the section can point to definite achievements by the time of the next convention, it is conceivable that the apathy of the past will turn to interest and support of the type the section merits.

### Another Case of the Bald-Headed Barber

**T**HE analogy of the bald-headed barber selling hair tonic has been applied often to the members of the industry who recommend or sell electric appliances which they themselves do not use in their own homes. This same analogy aptly fits the case of a Western central station with reference to the industrial heating field.

In this instance a new installation of equipment was made at the company's shops. This included a coil-baking oven using steam for heat, a brass furnace fired with oil, and an iron melting furnace burning coke. The commercial department of this same company is engaged in an industrial heating sales campaign in which electricity is recommended for each of these applications. Seemingly it is rather a short-sighted policy that would permit the installation of such equipment for company use rather than make model electrical installations which might serve the commercial department in excellent fashion for demonstration purposes. If this information were to become generally known among customers, would not these latter be inclined to think of the physician who refuses to take his own medicine or the valet whose trousers were always unpressed?

### Complacency Is Symptom of Dangerous Condition

**S**ELF-CONFIDENCE and self-satisfaction are powerful factors, useful and valuable when partaken of in small and well regulated quantities and extremely dangerous otherwise. And this applies to the corporation as well as to individuals. For a utility executive to permit himself to ponder upon the excellent quality of service that his company is giving its customers; to consider with pomposity the vital importance of his utility in community existence; or to glory in the marvels of its engineering achievements is to follow a road fraught with dangers. The present is no time for introspection or retrospection except for the purpose of determining how service may be extended, its quality improved and operating efficiencies increased.

To be sure, great credit is due the electrical industry for the strides that have been made, likewise

to the individuals within the industry who did the work. However, the industry's biggest job has not BEEN done, but remains to BE done. This job comprises important rate readjustments, the increasing of domestic consumption, rural developments, industrial power-factor adjustments, increased operating efficiencies, and ever-increasing quality of service. Here is a big job—one requiring the unified efforts of the accounting, operating, commercial, and engineering departments. In it there is no place for self-congratulation.

### Industry Must Not Be Over-Confident Regarding Outcome of Election

THE millenium will have arrived when an election is held on the Pacific Coast at which a political assault of one character or another is not made upon the utilities. The year 1926 has brought no respite from the usual political procedure. California voters will be presented on Nov. 2 with an old friend who for six years has not even changed his clothes, namely, the \$500,000,000 Water and Power Act. Twice decisively defeated, its sponsors are none the less discouraged. The proposed amendment is on the ballot again. It is to be hoped that on this occasion the old saying about the third time being a charm will work—the “charm” being such an overwhelming defeat that the measure will never again be initiated.

In the Pacific Northwest the scene of activity has been shifted from Washington to Oregon. In this latter state an organization known as the Housewives' Council, Inc., has brought forward a water and power bonding amendment like in many respects to the California legislation and in some even more visionary. However, the voters of the state have been informed fully regarding its dangers.

In both states there is a feeling of confidence that these measures will be subjected to a landslide of disapproving votes. There are serious dangers in such a feeling. Many a world series, many a football game and many a golf match have been lost due to over-confidence. The same holds true of elections.

### Importance of Electric Refrigeration Industry

WHILE electric refrigeration is the most rapidly growing child in the electrical family today, few realize the enormous growth which this industry has made in the past year. This is forcefully brought home in a recent issue of the Wall Street Journal which says:

The automatic electric refrigeration industry is increasing so rapidly in importance that facts and figures regarding its standing today are important. Few realize the industry is giving employment directly to 50,000 men, and indirectly to 50,000 more engaged in the production of the raw material it requires. Recent reports show that more than 20,000 men are employed in manufacturing household and commercial units in the United States.

The leading manufacturers have spent a great deal of time and money training salesmen and service men, with the result that there are now in this country more than 15,000 factory branch, distributor, dealer and central power

company salesmen selling household and commercial electric refrigerators. The service and installation men number more than 6,000, while those engaged as executives, clerical office help, and others miscellaneous employed, bring the grand total for the industry well above the 50,000 mark.

Predictions were made freely two years ago that this latest electrical product would foreshadow any previous performance of the industry in its development. Progress made to date indicates that such has been the case, and when attention is given to the plans which the manufacturers have announced for 1927, one can see the necessity for stabilization and standardization if further progress is not to be impaired.

### The Opportunity Offered by the Red Seal Plan

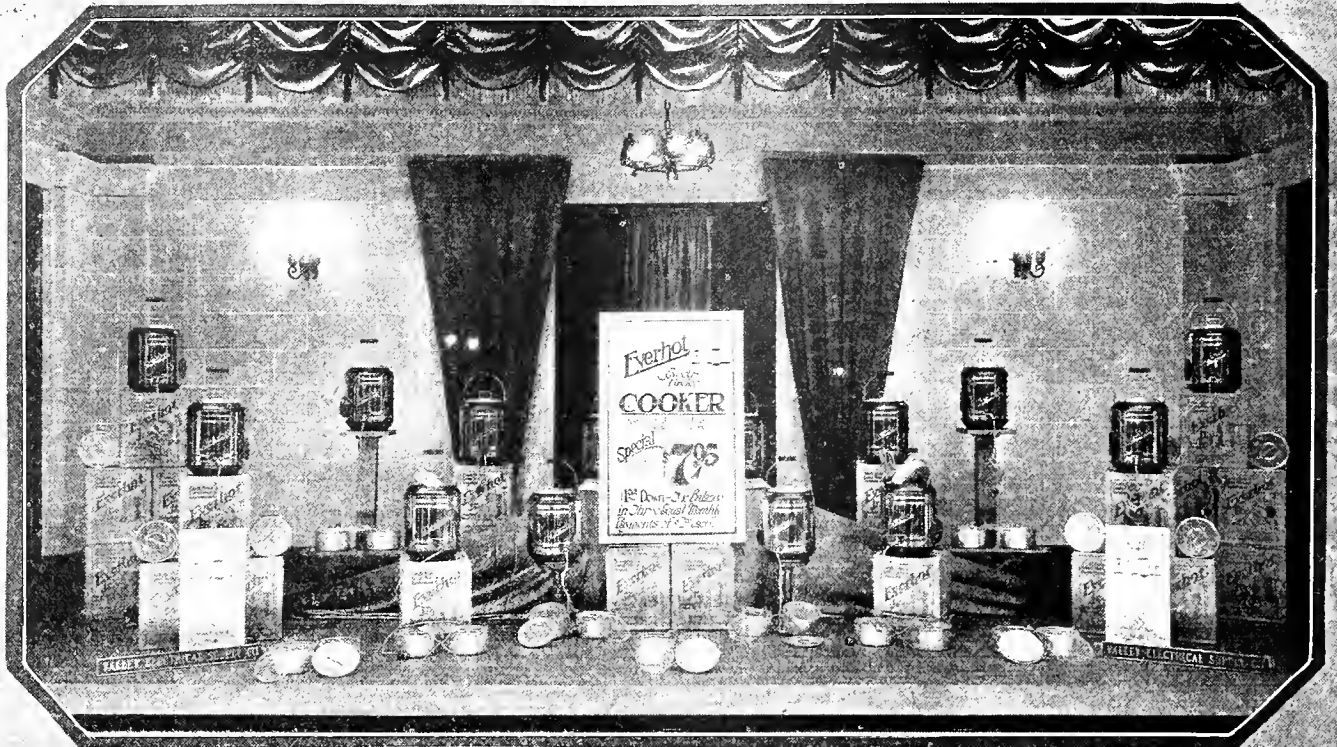
IN this issue there is a pictorial presentation of the story of the Red Seal campaign prepared by the editors in the belief that even men in the electrical industry are human and therefore like to look at pictures.

The pictorial method of presenting an idea or carrying a message is far older than the art of writing, and represented the first crude attempts at conveying thought other than by word of mouth. Even today, the traffic signs that warn the unwary of dangerous curves or railroad crossings ahead use the pictograph rather than the printed word.

A picture tells its own story while a word or group of words requires a distinct mental effort on the part of the reader in order to grasp the meaning of the writer. There is the “life” of the pictorial as compared to the cold, drab words of print or writing. Thus, with malice aforethought, has the Red Seal pictorial story been presented in this number in order that its significance may be grasped more readily and registered indelibly on the minds of the men of the electrical industry.

Truly, no movement of a co-operative promotional nature ever has been more constructive, or more significant, or more timely than this plan to educate the public to the necessity for adequate house-wiring. The statistician tells us that the domestic electrical field is but 10 per cent saturated. This means that 90 per cent of our homes are awaiting the message of the advantages of the electrical servant. Inadequate house-wiring is one of the most difficult items of sales resistance to overcome. At least, in the light of present-day knowledge of the domestic application of electrical energy, we should not permit the construction of a single home or apartment house without a wiring plan adequate to take full advantage of the use of electrical energy for performing every domestic function.

In the Red Seal plan lies the opportunity for the co-ordinated effort of every branch of the industry, and the responsibility rests squarely on the shoulders of those in charge of our great institutions to see that all hands from the office boy to the president do their share without stint in bringing the 10 per cent saturation point up to 100 per cent. Not until then will the electrical age have arrived.



FROM its two stores, one in Fresno and the other recently opened in Bakersfield, the Valley Electrical Supply Company operates its merchandising plan to add load to the lines of the San Joaquin Light & Power Corporation and its subsidiary, the Midland Counties Public Service Corporation. At these stores a complete merchandising set-up is provided. For the outlying districts, the many small towns scattered throughout the territory served by these power companies, the Valley Electrical Supply Company sells through the dealers located in those towns. The upper photograph reproduced here is one taken of a window display used during the very successful cooker campaign and shows the artistic and effective type of window display employed by this company. The lower photograph is of the newly rearranged Bakersfield store, where extensive remodeling of an old building resulted in this attractive display room.





# Load Building with Appliances

By H. H. Courtright

President and Manager, Valley Electrical Supply Company, Fresno

**W**HETHER or not an active merchandising organization in connection with and yet operated separately from a power company could produce results in increased sales of kilowatt-hours of electrical energy sufficient to justify its existence, has long been a subject of speculation and argument. Hardly a gathering of electrical men convenes these days without a discussion of this problem. There are those who maintain that such an organization does not justify its position and others who maintain otherwise.

It may be clarifying to some extent to present the experience of the Valley Electrical Supply Company of Fresno, Calif., under just such circumstances over several years. While an account of these experiences during the past six months under a well-defined sales plan may not be expected to settle for all time any discussion on this very much debated topic, it may present some aspects not familiar to all those who say that "it can't be done."

Under our arrangements with the San Joaquin Light & Power Corporation, we operate as a separate entity, responsible to that corporation naturally for successful operation, but individual in the conduct of our merchandising programs. In November, 1925, the Valley Electrical Supply Company entered into a contract with the San Joaquin Light & Power Corporation whereby it agreed to distribute a certain number of current consuming devices over the latter's system which consists of approximately 50,000 domestic consumers, during the year 1926.

For this service the San Joaquin Light & Power Corporation agreed to pay to the Valley Electrical Supply Company a stipulated sum for each kilowatt of appliance load represented in such sales.

The program laid out for compliance with the contract included active sales effort according to definite quotas established in the sale of heavy duty appliances, lamp socket appliances, home lighting, the establishment of a new store at Bakersfield and an active participation in engineering of new installations.

It was felt from the very beginning and has always been a policy with the organization, that every logical and sound means should be taken to bring about co-operation between the Valley Electrical Supply Company and individual independent con-

***A**PLIANCES present a medium for the load-building program of the future—now that in general industrial loads are almost automatically swinging towards electricity. In this article Mr. Courtright, one of the West's foremost merchandising men, describes the means the Valley Electric Supply Company has employed in building load on the lines of the San Joaquin Light & Power Corporation, serving the San Joaquin valley in California. The results obtained from these merchandising plans speak for themselves.*

tractor-dealers throughout the territory served by the San Joaquin Light & Power Corporation. That the contractor-dealers of the territory themselves value this co-operation has been demonstrated in many instances. In fact, as a rule, the inauguration of any special campaign on the part of this company has the support and co-operation of 84 dealers in the San Joaquin valley and territory served by the Midland Counties Public Service Corporation, a subsidiary of the San Joaquin Light & Power Corporation.

One of the most notable features of the 1926 cam-

paign so far has been that the largest part of the load added to the lines has been in the districts outside of Fresno, where our store is located, indicating that the dealer tie-up has proved satisfactory in practice.

Another significant point is that the load added to old customers' lines exceeded by an ample margin that installed for new customers coming on the lines. This is the most desirable type of load building, and is a real test of selling.

## Heavy Duty Appliances

The first item in the contract called for the Valley Electrical Supply Company to sell or help to sell 1,000 ranges, 800 water heaters, 500 large air heaters and 300 miscellaneous heavy duty appliances, the combined capacity of which was estimated to be 10,800 kw. This quota was distributed among the thirteen districts which make up the territories of the San Joaquin Light & Power Corporation and the Midland Counties Public Service Corporation; the estimate for the first six months of the year being set at 5,356 kw.

This was a high mark to shoot at, but considering that our salesmen were trained men, all of whom have been with us since the organization of the department and some of whom were with us long prior to that time, we felt confident the quota would be met.

And so it has been, for the total connected kilowatts of heavy duty appliances sold during these six months was 5,850, thus exceeding the quota by 494 kw.

Of the 1,101 pieces of heavy duty equipment installed under 786 jobs, 557 jobs or 70.9 per cent were sold to "old" consumers, the remaining 229 jobs—29.1 per cent to "new" consumers. In tabulating

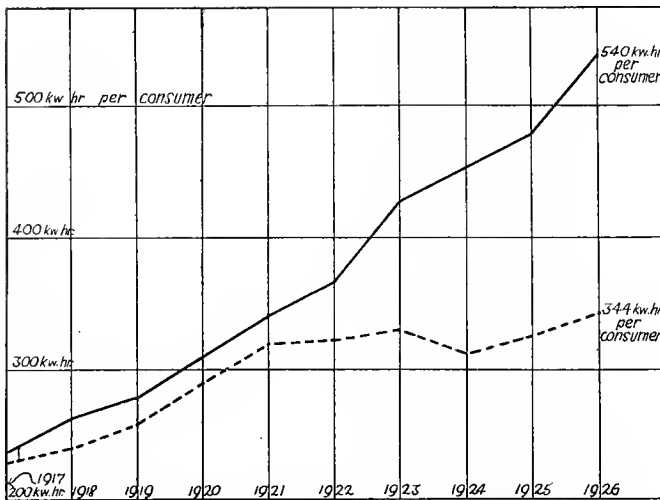


Fig. 1. System curves of the San Joaquin Light & Power Corporation, showing average kilowatt-hour per consumer growth in (black line) lighting consumers, including combination light, heat and cooking consumers, and (dotted line) domestic lighting consumers only. The drop in the latter curve is due to a dry year when consumers were urged to conserve power.

these sales we held that any consumer already having a lighting service and a meter in his house was to be considered an "old" consumer.

The accompanying charts, Figs. 1 and 2 are very significant for they show that we have concentrated our selling efforts on those consumers who already possess cooking and heating equipment of some sort in their homes, thereby replacing this equipment with electrical appliances.

Comparing the gross sales of this class of appliances the kilowatts connected and the estimated revenue to the power company, we find that the gain in gross sales for the first six months of the year over that of last year amounted to 25.1 per cent. Expressed in kilowatts connected this gain was:

Connected kw. first six months of 1926.....	5,850.4
Connected kw. first six months of 1925.....	4,309.9
1926 gain over 1925.....	1,540.5
or 35.7 per cent.	
Estimated yearly revenue to the power company .....	\$93,606.40
Revenue on appliances sold 1925 the corresponding period .....	68,958.40
1926 gain over 1925 .....	\$24,648.00
or 35.7 per cent.	

The reasons for these gains may be set down as, the increased experience of our trained salesmen; the success of the agent-dealer sales plan; and to local and home demonstrations of appliances.

#### The Agent-Dealer Sales Plan

Considerable interest attaches to the plan we have found successful in co-operating with electrical dealers throughout the territory served by the power company. Outside of Fresno heavy-duty merchandise is sold to the public through our local agent-dealers—the Valley Electrical Supply Company's salesmen doing all the preliminary work leading up to, as well as closing the deal.

This sale is then reported to our Fresno office for record and the appliance furnished to the dealer at as near our cost price as possible. The dealer pays for his purchase on a C.O.D. basis.

The sale then rests between the consumer and the dealer, who, between themselves, can make their own credit and payment terms—thus leaving the Valley Electrical Supply Company and the power company out of the picture. It must be remembered that many appliances are sold to rural consumers who depend mainly upon crop payments for their yearly income. Our arrangement is therefore an ideal one. The dealer takes care of the credit burden, but he also makes all the profits on the sale. On our part we escape the inevitable collection difficulties nearly always resulting from the sale of merchandise on credit to buyers who receive their income but once a year.

In the city of Fresno where our main store is located, the Valley Electrical Supply Company acts as an agent-dealer also, taking the sales profit on goods it sells directly as well as assuming the credit risk on those sales.

The field sales force, consisting of nine men, has put or helped to put on the power company's lines a total of 5,850 kw. during the first six months of this year. This averages 106 kw. per man per month or six kw. more than the set quota of 100 kw.

In addition to these field men, we employ one supervising salesman and one woman demonstrator, who both cover all districts frequently and at set times. The former checks up on the fieldmen's work, corrects mistakes and smooths over misunderstandings with consumers and dealers, and the latter conducts the cooking demonstrations about to be described.

#### Cooking Demonstrations

In years past we endeavored to bring electrical cooking before an interested public by supporting large cooking schools, arranged and conducted by the manufacturers of electrical appliances. These

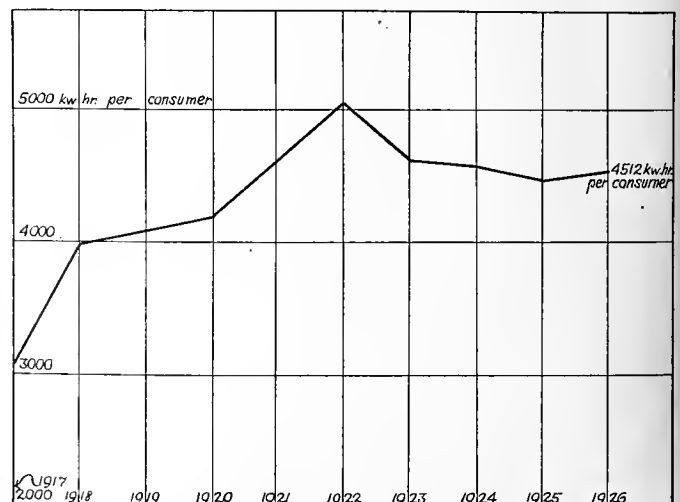


Fig. 2. The San Joaquin Light & Power Corporation system chart showing growth of combination lighting, heating and cooking consumption in kilowatt-hours per consumer. The sharp rise and peak in 1922 were due to sales effort to place automatic water heaters on lines, sold with the idea of leaving them on continuously, a policy since discontinued.

schools were held mostly under the auspices of a local newspaper and staged in some semi-public building—preferably a hotel. The duration of these affairs was from three to five days; at the conclusion of which we gave away valuable prizes for the best bread, cake and pie brought before a group of disinterested judges.

Large crowds were attracted to these schools and well have they filled their purpose—that of bringing electrical cookery to the attention of the greatest possible number of housewives. Soon we found, however, that although the publicity feature of these schools was of great value to us, there were other less desirable angles which finally made us decide to discontinue this type of demonstration.

For instance, the large prizes offered for the best entries of home-bake craft were given regardless of the cooking medium by which they were produced. Such entries might have been made in a wood, gas or oil stove, and it was natural for the winner to feel that since her stove could produce a prize winning article, it would not be wise to discard it in favor of an electrical range of unknown performance.

Also, since the prizes were very valuable ones with a completely installed electrical range usually heading the list—it happened that however carefully the awards were made by absolutely unbiased judges, there would be a feeling of disappointment among the many unsuccessful competitors who considered their entries to be superior to or at least peers with the prize winning one. It was sometimes hinted that the jury was "fixed," and undeserved as was this suspicion, it did not promote a friendly feeling between the public and the Valley Electrical Supply Company.

Again, since the schools attracted large numbers of women from all walks of life, society matrons as well as wage-earners, many of the latter were timid in asking questions about the processes demonstrated but in which they found themselves interested. Most women do not like to be conspicuous and would rather remain in the dark about the subject under discussion than speak up before a large assembly of their kind.

The cost of the schools was very heavy, running in many instances well over \$500, and we did not feel that we were enjoying an adequate return for so large an outlay.

Considering all these reasons, we decided that small local demonstrations, frequently held by our own employees, would produce better results at a more moderate cost. This we are doing now, and by this method are establishing satisfactory contacts with the buying public. Following is the usual procedure:

### Small Demonstrations Better

We advertise that a cooking demonstration will be held in the stores of our local agent-dealer and invite all interested to attend.

Instead of limiting the demonstration period to a few hours in either forenoon or afternoon, thus again assembling large and unwieldy crowds, our demonstrator gives what might be termed a continuous demonstration starting with the opening of the store and lasting all through the business day. In the morning she may be canning fruit or making pies and pastry, and in the afternoon she usually prepares an entire meal, all the while showing the onlookers the most economical way of using an electrical range.

In this way electrical cooking is demonstrated to ever-varying small groups of women, any one of whom may ask the demonstrator such questions as may come to her mind, and receive an intelligent and personal answer.

The meal prepared in the afternoon may be served either to the visitors or lots may be drawn for it amongst them. In addition we gave away one or two small electrical appliances, such as a cooker and a toaster, which, while inexpensive, help to make the recollection of the demonstration an agreeable one.

Finally, the dealer, with the assistance of the demonstrator, takes the names of all likely prospects and sees to it that these leads are turned over to the Valley Electrical Supply Company's salesman for follow-up. Through this type of store demonstrations we have secured more live prospects and made more actual sales than were ever realized during the course of our former elaborate and expensive cooking schools.

### Lamp Socket Appliances

As a second item in its contract the Valley Electrical Supply Company undertook to sell a total of 20,000 lamp socket appliances during the entire year. This quota was made up as follows:



Left: One of the attractive lamp window displays at the Valley Electrical Supply Company, Fresno, during the home lighting campaign. Center: A cooking demonstration set up in the store of a hardware dealer in Parlier, Calif., one of the small towns in the valley. Right: A striking window display used during the very successful cooker campaign.

As some of these appliances are of seasonal character and only sold during the colder months, also because Christmas with its increased demand for electrical merchandise comes in the latter part of the year, the sales quota for the first six months was set at less than half the yearly total. Thus a quota of 7,250 pieces (3,193 kw.) was allotted to the first six months of the year. The actual sales have exceeded this quota by 1,185 pieces (511 kw.) thus bringing the total to 8,435 pieces (3,705 kw.).

Durng each of the past six months we intended to campaign one special appliance, as follows:

January .....	waffle irons
February .....	toasters
March .....	percolators
April, May June .....	cookers
June .....	fans

These appliances, in addition to being sold through our Fresno and Bakersfield stores, were also retailed through our agent-dealers. The delivery of waffle irons for the January campaign being delayed, we found it necessary to postpone this and all following campaigns thirty days. This made us lose the first month of our half year's period as regards intensive selling and necessitated a complete rearrangement of our campaign plans.

The following figures show interesting comparisons of gross sales, kilowatts connected and estimated power company earnings on lamp socket appliances for the first half of 1926 as compared with the same months of 1925. Gross sales increased 65.6 per cent during this period.

Kilowatt connected load for:

First six months of 1926.....	3,704.8 kw.
First six months of 1925.....	1,505.6 kw.

1926 gain over 1925 .....	2,199.2 kw.
or 146 per cent.	

Estimated yearly revenue on appliances sold:

First six months of 1926 .....	\$37,048.00
First six months of 1925.....	15,056.00

1926 gain over 1925 .....	\$21,992.00
or 146 per cent.	

Eighty per cent of this volume was moved through our own stores, both in Fresno and in Bakersfield, and twenty per cent through our agent-dealers in the districts. Goods were billed to these

agents at an advance of 10 per cent over our cost; this addition to cover our expense of warehousing and reshipping.

Dealer Plan for Small Appliances

A very definite agent-dealer plan for sale of small appliances was also worked out to operate in territory outside of Fresno and Bakersfield. Fifteen days prior to the start of one of the monthly appliance special campaigns one of our salesmen called on every dealer in the territory served by the power company, offering each one an opportunity to tie in with our special sales.

During this period just past 84 dealers have co-operated in these plans. Each one willing to co-operate was asked how many of the special appliances he felt sure he could dispose of and was urged to estimate the number conservatively. The salesman thereupon left with the dealer the required number of appliances, receiving in exchange a check for them in each case. The appliance was sold to the dealer at 30 per cent below the listed sale price of the appliance or at practically its cost to the Valley Electrical Supply Company.

Each dealer was then urged to display the special appliance prominently and to use every call for the special as an opportunity to attempt to sell the standard lines of these appliances rather than the special, at the regular list price. This, he was told, would net him 40 per cent on each sale instead of 30 per cent and be fairer to the jobber. In other words, he was urged to use the special as a leader from which to better his own sales on standard lines.

Promptly on the morning after the close of each campaign the salesman called to take back the advertised special, refunding money on each appliance unsold. In this way dealers were obliged to close the special sales simultaneously in every part of the territory. The appliances were also withdrawn so that dealers might not continue to display them at the feature price and thus tend generally to reduce prices.

In each case broadsides and newspaper advertisements used in connection with the campaigns carried the names of the individual dealers who were co-operating in the district in which they were distributed. This proved valuable advertising to the dealer and boosted his sales, as well as acquainting his district with his store. Other dealer helps were furnished also.

TABLE I

LAMP SOCKET APPLIANCES—USE AND EARNINGS

Appliance	Rated Wattage	Hours Per Yr. Use	Kw-hr. Per Yr. Use	Rate Per kw-hr.	Annual Rev. per Appliance	Annual Revenue per kw.	Number of Appliances to be sold in 1926	Total kw. to be sold in 1926	Annual Revenue from 1926 sales
Cookers.....	400	364	145.6	\$.07	\$10.19	\$25.47	6000	2400	\$61,140
Air heaters.....	600	360	216.0	.07	15.12	25.20	3000	1800	45,360
Toasters.....	550	104	57.2	.07	4.00	7.27	2500	1375	10,000
Waffle irons.....	660	104	68.6	.07	4.80	7.27	1500	990	7,200
Flat irons.....	600	156	93.6	.07	6.55	10.92	1400	840	9,170
Fans.....	60	450	27.0	.05	1.35	22.50	1200	72	1,620
Table stoves.....	660	91	60.1	.07	4.21	6.38	500	330	2,105
Vacuum cleaners.....	200	104	20.8	.07	1.46	7.30	400	80	584
Soldering irons.....	250	624	156.0	.04	6.24	24.96	300	75	1,872
Battery chargers.....	100	1560	156.0	.07	10.92	109.20	200	20	2,184
Percolators.....	420	120	50.4	.07	3.53	8.40	2500	1050	8,825
								9032	150,060
Average revenue per kw. on above basis.....					\$16.61				
Average revenue per kw. on 1c lower rate.....					14.14				
Average used in estimating earnings.....					10.00				



Of the four appliance sales featured during the first six months of the year, the waffle iron and the cooker campaigns were the most successful in point of quantity sold. In both these sales we disposed of many more appliances than we originally estimated, the waffle iron sales even totaling more than double the set quota. Accompanying tables show the results of these.

## Home Lighting

Last year we inaugurated a house-to-house sales campaign on all-white Mazda kitchen lamps, and sold to 40 per cent of our consumers in the city of Fresno. No special effort was put forth in this direction this year, but through such desultory canvassing as has been carried on we have sold 1,452 of these lamps, thereby putting on the power company's lines a total of 145.2 kw. Sales cost of this service was \$5.71 per kw. or \$828.09. Estimated yearly revenue to the power company on these lamps at \$3.75 per lamp was, however, \$5,445.

## Our New Bakersfield Store

During the year the Bakersfield power building has been remodeled according to the ideas advanced in our 1926 sales program. In that program it was shown that the most desirable arrangement, both from a merchandising point of view and from the utility's standpoint was that in which the power company's consumers' counter and cashier's desk are located within the walls of the retail store.

In the Bakersfield change, the consumers' counter and the cashier's desk were placed in the rear of the store, thus bringing through that store and past the merchandise displayed therein all persons having business with the power company. The result has been a large increase in gross merchandise business.

The results of the remodeling may be set down as follows:

(1) The general appearance of the power company's building has been greatly improved.

(2) The Valley Electrical Supply Company has one of the most spacious and attractive electrical retail stores anywhere in this state.

(3) The Bakersfield public is showing increased

friendliness of feeling toward the power company; this, undoubtedly due to the more cheerful and appealing surroundings in which it meets our employees.

(4) The spirit of the power company's employees has been improved and its general efficiency raised as a result of the more commodious and dignified quarters provided for their use.

The gross sales during the months of April, May and June of this year, as compared with the same months during the preceding year showed an in-



Portable fair booth, which can be knocked down to transport to each of the many fairs in the San Joaquin Valley.

crease of 147 per cent. This demonstrates, perhaps, better than any other single instance the value of such a set-up over the efforts of the power company alone.

## Fair Booth

One of the advertising features which we have found to bring surprisingly good results has been the portable booth designed to be set up at each of the numerous county fairs held during the summer in the San Joaquin Valley. The Valley Electrical Supply Company built the portable demonstration booth as provided in its 1926 sales contract. Using this booth as a center for our displays we intend to exhibit and demonstrate electrical appliances extensively at all county and local fairs which, in our opinion, will warrant the expenditure.

Two charts made up by the power company's

TABLE III  
COMPARISON OF ESTIMATED AND ACTUAL SALES OF HEAVY DUTY APPLIANCES FOR THE FIRST SIX  
MONTHS OF THE YEAR 1926

Items	Sales			Kw. Put on Lines			Estimated Yearly Revenue			Sales Cost		
	Esti- mated	Actual	Under	Esti- mated	Actual	Over	On Quota	On Sales	Over	Esti- mated	Actual	Over
Ranges.....	506	457	49	3036	3146.7	110.7	\$48576.00	\$50347.20	\$1771.20	\$15422.88	\$15985.24	\$ 562.36
Water Heaters.....	400	385	15	1600	1678.9	78.9	25600.00	26862.40	1262.40	8128.00	8528.81	400.81
Air Heaters.....	210	123	87	420	469.0	49.0	6720.00	7504.00	784.00	2133.60	2382.52	248.92
Other H. D. Appl...	150	136	14	300	555.8	255.8	4800.00	8892.80	4092.80	1524.00	2823.46	1299.46
<b>TOTAL.....</b>	<b>1266</b>	<b>1101</b>	<b>165</b>	<b>5356</b>	<b>5850.4</b>	<b>494.4</b>	<b>85696.00</b>	<b>93606.40</b>	<b>7910.40</b>	<b>27208.48</b>	<b>29720.03</b>	<b>2511.55</b>

6 months sales of heavy duty appliances.....	5850.4 kw.
6 months quota of heavy duty appliances.....	5356.0 kw.
Sold over quota.....	494.4 kw.
6 months estimated revenue on sales.....	\$93606.40
6 months estimated revenue on quota.....	\$85696.00
Estimated revenue over quota.....	\$ 7910.40
Estimated kw. quota for 12 months.....	10,800.00
Estimated revenue for 12 months on this quota.....	\$172,800.00

Estimated yearly revenue on heavy duty appliances sold these six months.....	\$93606.40
Sales cost to power company.....	29720.03
or: 31.75% of one year's revenue.	
Estimated 5 years' revenue on heavy duty appliances sold these six months.....	\$468032.00
Sales cost to power company.....	29720.03
or: 6.35% of 5 years' revenue.	

rate and contract division, showing the kilowatt-hour consumption per domestic consumer per year during the years 1917 to and including 1926 tell an interesting story. The 1926 consumption has been computed on the basis of the actual use during the first six months of the year.

The lower curve on Fig. 1 shows the number of kilowatt-hours used per domestic consumer for lighting and small appliances only. The drop indicates the year 1924, when there was a dry year and the economic conditions of the San Joaquin Valley were depressed. The years 1925 and 1926 show an upward trend, the expectation being that at the end of the current year the consumption will have increased to a point above that of 1923.

In our opinion, this increase is partly due to the large number of lamp socket devices which we have placed on the power company's lines during these last two years—in 1926 we will have placed by this campaign alone 20,000 appliances among 50,000 consumers—also to our work in educating the public to a more frequent use of these appliances and of those already in their possession. We feel we have taken numbers of domestic appliances from sideboards and out of closets and put them into daily and gainful use.

The curve on Fig. 2 shows the kilowatt hours used per domestic consumer for heating and cooking. The drop in 1922 was caused by the fact that automatic water heaters were sold on the idea of leaving them on the line continuously. However, this policy was changed and the resultant manual operation of the heaters caused a drop in consumption. This curve shows a decided improvement for the current year. This increase may be partially accounted for by our success in selling additional equipment, such as water heaters and air heaters, to those consumers already possessing electrical ranges. And also to the frequent visits made by our demonstrator to all domestic users of heavy duty appliances.

The demonstrator has found in numerous cases that due to one or two discouraging failures, the range oven was no longer being used; this resulting, of course, in loss of revenue to the power company. In such cases we make it a point to demonstrate the use of the oven to the consumer in her own home, even going to the extent of cooking an entire meal in her presence.

About thirty days after this first call, our demonstrator again visits the consumer and in a majority of cases finds the oven being used daily by a thoroughly satisfied housewife.

In line with these conditions and in conclusion it is only necessary to point out the importance of this work to the power company.

It would be possible of course to sell these appliances at a profit—that is, to sell a smaller volume and perhaps make a showing of profit on straight-away merchandising. But there would be less load-building value in such a method, and the power company's interest is primarily in putting kilowatts on the lines. The power company is interested also in maintaining favorable and friendly relations with the dealers, which under the policy now prevailing we are able to do. The sales expense to the power company may seem disproportionate for a single year. But we are figuring over a number of years and the permanent value of such work to the power company. On a five years' basis, it is apparent that the sales cost is low. We believe our estimates are conservative, in fact below the actual results that will be achieved. The work of demonstrators and the following up of appliance sales to educate the housewife to further use of them is, in our opinion, bound to result in increased consumption and in consequence additional revenue to the power company. Our work does not cease with putting the appliance into the home. We keep in touch with the purchaser and promote and encourage to as great an extent as possible more general use of the appliances.

TABLE II

COMPARISON OF ESTIMATED AND ACTUAL SALES OF LAMP SOCKET APPLIANCES FOR THE FIRST SIX MONTHS OF THE YEAR 1926

Sales			Kw. Put on Lines			Estimated Yearly Revenue			Sales Cost			
Items	Esti- mated	Actual	Over Under	Esti- mated	Actual	Over Under	On Quota	On Sales	Over Under	Esti- mated	Actual	Over Under
Cookers.....	2050	2558	508	820.00	1024.50	204.50	\$8200.00	\$10245.00	\$2045.00	\$3001.20	\$3749.67	\$ 748.47
Toasters.....	1070	929	141	588.50	510.95	77.55	5885.00	5109.50	775.50	2153.91	1870.08	283.83
Air Heaters.....	125	90	35	75.00	66.44	8.56	750.00	664.40	85.60	274.50	243.17	31.33
Waffle Irons.....	1080	1602	522	712.80	1051.33	338.53	7128.00	10513.30	3385.30	2608.85	3847.85	1239.00
Flatirons.....	425	686	261	255.00	394.65	139.65	2550.00	3946.50	1396.50	933.30	1444.42	511.12
Fans.....	500	590	90	30.00	38.28	8.28	300.00	382.80	82.80	109.80	140.10	30.30
Table stoves.....	250	105	145	165.00	63.00	102.00	1650.00	630.00	1020.00	603.90	230.58	373.32
Heat pads.....	30	63	33	1.80	3.78	1.98	18.00	37.80	19.80	6.59	13.83	7.24
Vac. Sweepers.....	170	176	6	25.50	26.40	.90	255.00	264.00	9.00	93.33	96.62	3.29
Sold. Irons.....	60	24	36	12.00	4.80	7.20	120.00	48.00	72.00	43.92	17.57	26.35
Battery chargers.....		22	22		2.20	2.20		22.00	22.00		8.05	8.05
Percolators.....	1150	1060	90	460.00	444.08	15.92	4600.00	4440.80	159.20	1683.60	1625.33	58.27
Miscellaneous.....	340	530	190	47.60	74.34	26.74	476.00	743.40	267.40	174.22	272.08	97.86
TOTALS.....	7250	8435	1185	3193.20	3704.80	511.60	\$31932.00	\$37048.00	\$5116.00	\$11687.12	\$13559.35	\$1872.23

6 months sales of lamp socket appliances.....	3704.8 kw.
6 months quota of lamp socket appliances.....	3193.2 kw.
Sold over quota.....	511.6 kw.
6 months estimated revenue on sales.....	\$37048.00
6 months estimated revenue on quota.....	\$31932.00
Estimated revenue over quota.....	\$ 5116.00
Estimated kw. quota for 12 months.....	8500.00
Estimated yearly revenue on this quota.....	\$85000.00

Yearly revenue on lamp socket appliances sold these 6 months.....	\$37048.00
Sales cost to power company.....	13559.57
or 36.6% of one year's revenue.	
5 years' revenue on above appliances.....	\$185540.00
Sales cost to power company.....	13559.57
or 7.32% of 5 years' revenue.	

# Field for Industrial Electric Heating in the Pacific Coast States

By E. J. Cipperly

Industrial Heating Specialist, General Electric Company, Los Angeles

**A**LMOST without bounds is the field of industrial electric heating, for applications may be made in virtually every shop, factory and industrial plant throughout the country. There is hardly a manufactured article that is not subject to some heating operation during process of production and in many instances the operation is best performed by the use of electricity.

Possible applications are too numerous and varied to permit complete tabulation here, yet even the following brief description of certain applications that have been in use for several years is sufficient to impress one with the fact that electric heating has gained a permanent place in industry and is an economic factor impossible to overlook.

On the Pacific Coast electricity is employed in the steel industry for a great many purposes; in the glass industry for the annealing process and in the baking industry for the baking of bread and cakes.

In the firing of vitreous enamel on bath tubs and other bathroom fixtures—also on household ranges both gas and electric types—electric heat produces ware that is superior in every way to enamel fired by other fuels.

The melting of babbitt for electric motors is distinctively an electric application while in the jobbing foundries where iron and steel are melted and where cores are baked, electric heat is accomplishing highly desirable results.

Then, in the creameries and dairies small electric steam boilers are quite generally used and in the printing industry in connection with typesetting machines and stereotype pots, electric heat for a number of years has proved successful.

In the many furniture factories of this section electrically heated glue pots are employed to some extent but the advantages of glue pots electrically operated are so marked that universal application ought to be made.

Practically every machine shop should have at least one tool room furnace, and garages and electrical repair shops are an excellent market for electrically heated compound melting pots. Also it should be noted that in all sheet metal shops electrically heated soldering irons should be used in place of the gas fired soldering irons. In the railroad shops electric heat is used most satisfactorily

**C**ONTRARY to general opinion there is a definite field for industrial electric heating in the Pacific Coast territory, notably installations of a small character. This field, together with a plan for cultivating it by the central station, is discussed in this article by a man who is thoroughly familiar with industrial heating and its problems.

for baking armatures and for melting babbitt. Electric heat for the coloring of citrus fruit, the drying of walnuts and the germination of seeds represents other important applications.

In the manufacture of steel, for the many purposes which it is used today, we find the electric arc-melting furnace almost a standard tool in the industry. We then come to the various stages through which steel

must pass before it becomes usable material, namely, annealing, hardening, drawing and carburizing. Many successful applications of electric heat during these different stages of production have been made in the past five years. Figs. 1, 2 and 3 show typical installations.

Modern industry constantly seeks to improve the quality of its products and electric heat renders powerful aid to this end. Not only is the product always improved through the use of electric heat but the cost of manufacture frequently is reduced although the saving is not necessarily in the heating process itself but rather in the overall cost of production.

By way of illustration, the experience of an automobile manufacturer may be cited. He reports a saving of from three to six cents on each gear treated with electric heat, although the unit cost for energy is three-fourths of a cent higher than for other fuel. The overall economy lies in the reduction of scaling and in the consequent saving of labor formerly required to clean the gears. Another manufacturer has found that electricity, costing 1 cent to heat a single part, saves 2½ cents on labor.

When treated with electric heat, gears are stronger, bath tubs smoother, lenses clearer, bottles less likely to break, copper wire more ductile, and sheet brass uniformly soft and free from scale—all the result of even heat, perfectly controlled and accurately adjustable throughout any required range of temperature—advantages that are certain to be secured only where electricity is used.

Many fender plants on the Pacific Coast are equipped with electric ovens and several of the best equipped electric fender enameling shops in the country are located in Los Angeles. An installation in one of the shops is shown in Fig. 5.

A complete electric foundry, using electricity for melting, baking of cores and heat treating of the

steel parts, located in Los Angeles, has been in operation for three years.

These installations are cited to show a few of the more important well established uses of electricity.

The industrial heating line in general consists of small self-contained devices such as soldering irons, glue pots, solder and babbitt melting pots and tool

shows an application of electricity made on an existing pot without materially changing the equipment, thus converting a gas fired stereotype pot to an electrically heated one, bringing the central station a revenue running into thousands of dollars each year that formerly went elsewhere. With this

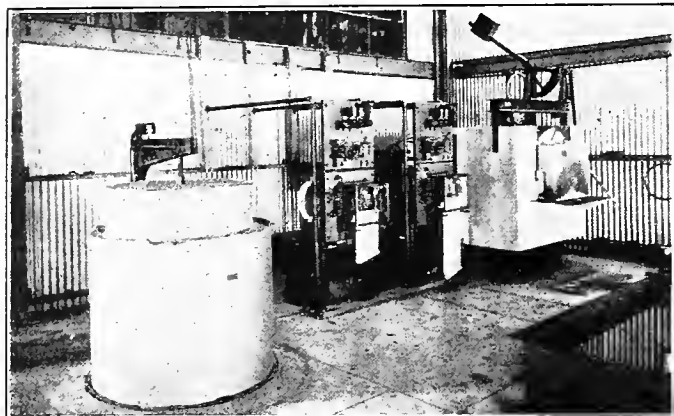


Fig. 1. Heat treating room for oil-well tools, Emsco Tool Company, Los Angeles

room furnaces, and many kinds of heating units suitable for the great variety of process machines and heaters and control equipment for industrial ovens.

For larger furnaces, complete electrical equipment, together with suitable automatic control panel and temperature control instruments are available. The electric resistor furnace for various applications can be obtained in sizes as small as 5 kw. to those large enough to accommodate the entire casting of a large turbine housing or a 300,000-lb. gun forging. Such furnaces have been built with connected load from 700 kw. to 2,700 kw.

The use of electric heating in the glass industry is reasonably developed and here there are many possible applications. Figs. 6 and 7 show typical installations of electric glass annealing lehrs.

In the electrical industry are many applications of electric heat for ovens used to bake armatures. A typical installation is shown in Fig. 9. A bank of babbitt melting pots for rebabbitting bearings is shown in Fig. 10.

Numerous installations of electric heating units in stereotype pots have recently been made. Fig. 4

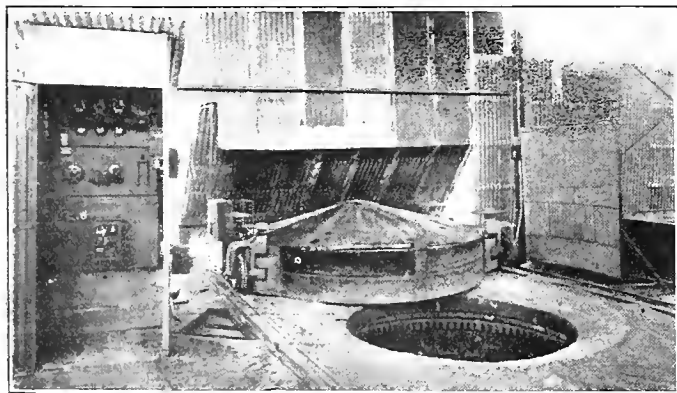


Fig. 2. Direct heat, vertical cylindrical furnace operating at 1,800 deg. F., Alloy Steel & Metals Company, Los Angeles

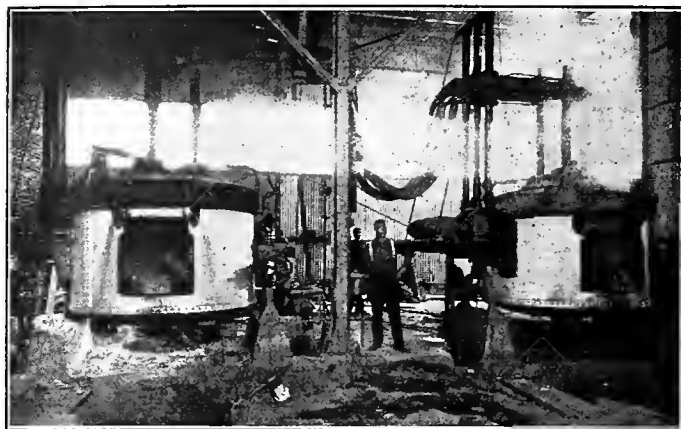


Fig. 3. Typical steel melting furnace installation, Alloy Steel & Metals Company, Los Angeles

type of installation, the heating elements are immersed directly into the bath of metal and the temperature control is automatic, giving the same temperature metal at all hours of the day. The installed capacity is sufficient so that when a considerable amount of cold metal is put in the bath, the pot is ready for operation in a few minutes. The automatic control immediately turns on the electricity when the metal is chilled from adding the cold metal and the temperature of the metal is brought back to normal in a short time.

The central station, like all other business enterprises, should be seeking new fields of endeavor, for, as with other enterprises, the future of its growth is dependent upon developing new uses for its product, in other words, methods for increasing its load.

The potential business in connection with industrial electric heating is almost unlimited as the field extends into practically every branch of industry. Nearly every central station has many industries in its district from which a very small revenue is received. With the installation of industrial heating appliances in these industries, the revenue can be

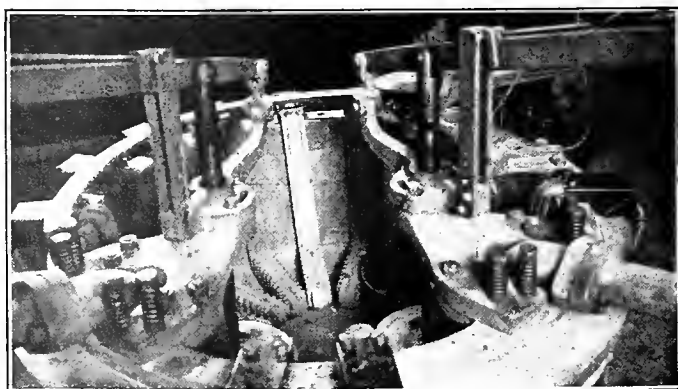


Fig. 4. Five-ton electric stereotype melting pot of the type used in newspaper plants



increased many times, usually without a very large investment on the part of the central station.

The following are typical installations from which central stations are deriving revenues of \$200 to \$1,200 a month and formerly these processes of heating were carried on by various other fuels,



Fig. 5. Enameling oven for baking fenders.

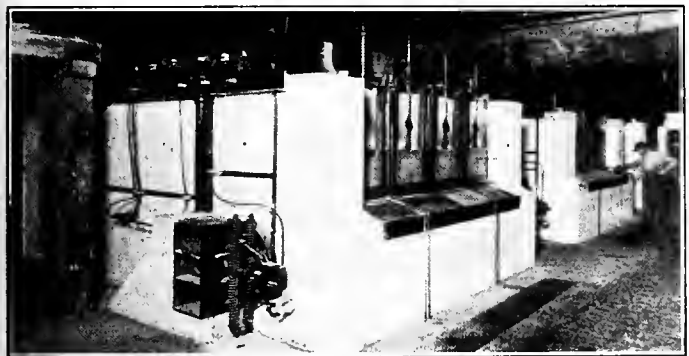


Fig. 6. Front view of electric lehrs or glass annealing furnaces, Illinois Pacific Glass Company, San Francisco

especially on the Pacific Coast where gas and oil are considered the customary products to be used in heating.

The Alloy Steel & Metals Company, which uses electricity for melting steel, formerly used gas and oil for its core baking and heat treating. About two years ago, this concern installed an electric core baking oven and heat treating furnace having a total connected load of 300 kw. This equipment is in daily operation, sometimes 24 hr. per day, and it will readily be seen from this that the load is very desirable from a load factor standpoint and a power factor standpoint. Figs. 2, 3 and 8 show the melt furnace, core bake oven and heat-treating furnace.

Fig. 1 shows an installation of two electric furnaces at the plant of the Emsco Derrick & Equipment Company, Los Angeles, Calif. The total consumption of these furnaces is about 35 kw. per hour and when operating 24 hr. per day and 30 days per month, a revenue is obtained when electricity is sold at 2 cents per kw-hr. of about \$6,000 per year. Heretofore, this money now spent for electricity was used to purchase gas or oil.

Figs. 4 and 5 show installations of glass annealing lehrs at the Illinois Pacific Glass Company, San

Francisco, 1,500 kw. being installed in this service, which means that a very high monthly revenue is now obtained from the application that formerly was carried on either by gas or oil.

Fig. 9 shows a two-chamber semi-continuous type conveyor oven installed at the Los Angeles Railway Company's plant. Here is a connected load of 70 kw. which operates at practically a 100 per cent load factor. Baking is carried on in periods of 24 hr.

The installation shown in Fig. 10 is at the plant of the Los Angeles Railway Company. It consists of three high temperature babbitt melting pots with automatic control features and a preheating oven, electrically heated for preheating the bearing shells before rebabbitting. In addition to this, a 6-kw. installation of immersion heaters is used for heating water and fluids for removing the grease from the bearings before melting out the old babbitt. Here again is an installation of 60 kw. for doing work that was previously accomplished by use of gas.

The desirability of the industrial heating load should interest the power companies to the extent that they should have an industrial heating department retaining the services of a trained heating specialist fully informed on manufacturing processes, in connection with heat treating, foundry practice, baking, drying, annealing of glass, steel manufacture and baking of food stuffs, especially bread. This specialist should also be informed in connection with the melting of the lower melting alloys, including babbitt metal for bearings, die casting metals and solder.

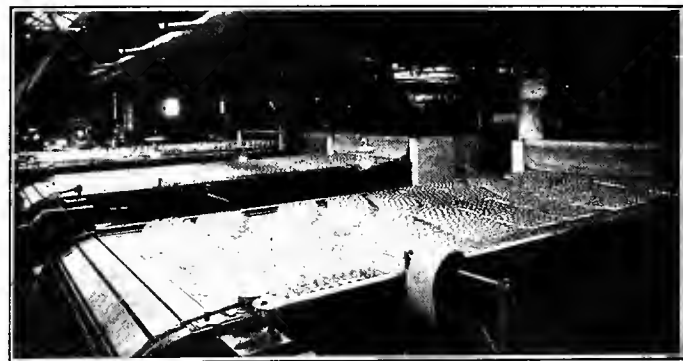


Fig. 7. Rear view of glass annealing furnaces.

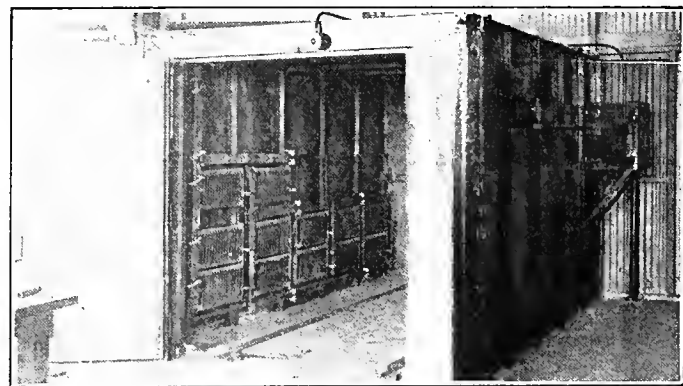


Fig. 8. Box-type core baking oven, Alloy Steel & Metals Company, Los Angeles

Since there is no longer any doubt that electric heating in industry has gained a permanent place as an economic factor, why is it that the central station does not have men in its organization fully informed on this subject so that customers could be assisted in planning applications? Considerable harm may be done by wrong applications through the sale of heating equipment as a result of promotion and advertising without engineering advice, and, therefore, the central station should have an industrial heating engineer familiar with all types of industrial electrical heating equipment, who should be in a position to make decisions regard-

create an electrical heating consciousness in their own organizations and moreover have trained heating specialists in their organizations who are in a position to analyze each problem as it comes to them and determine exactly whether or not it is desirable business, and a feasible application for electricity. Numbers of men for this service have been trained at Eastern factories or have attended some of the industrial heating schools held under the auspices of the National Electric Light Association. These schools are held yearly and each central station should embrace the opportunity and have one or more of its men attend this school to become familiar with the application of electricity for heating.

When speaking of the Pacific Coast as a field for electric heating, the tendency in most minds is to think of a section having very cheap fuel in the way of oil and gas, in view of which it is interesting to note that the rapid increase in the use of electric furnaces for so many purposes in preference to fuel fire types of all kinds may be given in two words: **overall economy**. Perhaps in a good many cases the actual cost of energy for operating an electric furnace is higher than corresponding fuel fired type, but the benefits derived in the way of the quantity and quality of finished products in most cases counterbalance the difference in cost. After all, what is most important is the total cost of the finished product, not in the comparative B.t.u. in a given amount of fuel.

Recently there has been distributed to the new business departments of all the central stations on the Pacific Coast, a complete treatise on electric heating. This treatise was distributed under the auspices of the Pacific Coast Electrical Association, and contains full information concerning a great many applications on the Pacific Coast and in the East, with complete data on each installation giving names of customers. Also contained in the treatise is full information relative to catalogs of the various manufacturers. With the information and help given to the central stations by the Pacific

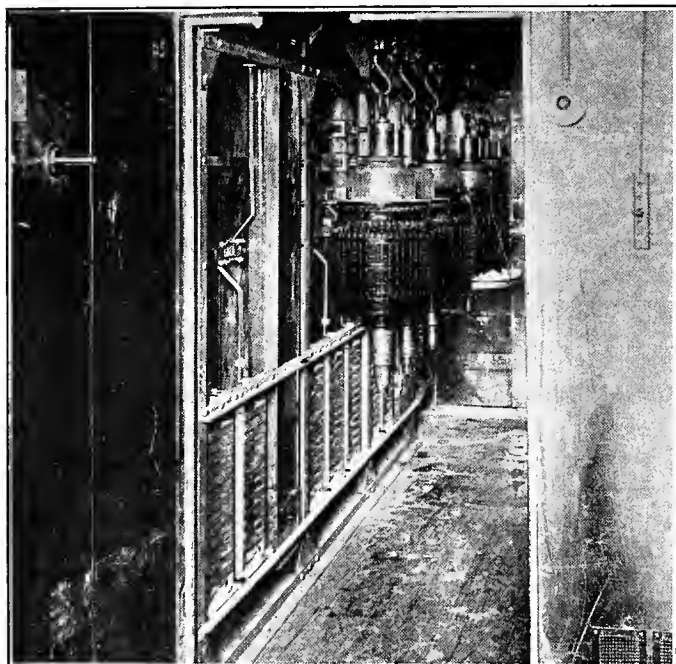


Fig. 9. Thirty-foot section of two-chamber semi-continuous type conveyor oven for baking railway motor armatures, Los Angeles Railway Company.

ing the true economic value of the particular equipment for the particular job.

When improper applications are made, it is not only a loss to the customer, but the central station as well for it has incurred an expense of running lines, hanging transformers and setting meters. As surely as improper installations are made, the cost of operation and every unsatisfactory condition will become apparent to the user and the equipment dispensed with, which will mean that the central station will find it necessary to take down transformers and not only lose the revenue which it had hoped to make, but have an excessive amount of distribution equipment on its hands. The central station should have an industrial heating engineer for its own protection as well as for the customer's benefit. After an improper application, a customer probably would be skeptical of electric heating for some time and it might take many months of effort to convince him that any of his propositions could be handled successfully with electric heat.

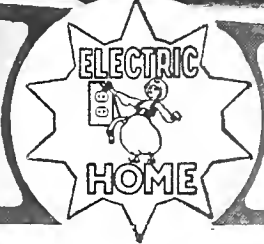
Many central stations, including those which are combination companies selling gas as well as electricity, are using their own internal magazines to



Fig. 10. Electric babbitt-melting pots in rebabbiting bearings, Los Angeles Railway Company.

Coast Electrical Association and manufacturers, it behooves each company to have in its organization a trained heating specialist to guide and help customers in the proper application of electricity for heating.

Selling  
the  
Red Seal  
Home



## THE SYMBOL OF ADEQUATE WIRING

**THE RED SEAL** is the mark of identification of a service performed in behalf of public interest. **THE SERVICE** consists of the establishment and maintenance of a standard of adequacy in the installation of wiring and other equipment designed to facilitate the utilization of electrical conveniences now available and as they are developed and improved from time to time by the progress of electrical science and invention.

**THIS STANDARD OF ADEQUACY** is a careful estimate of the requirements of this community as to electric service and is based upon a survey of the conditions under which electric service is utilized in this community.

**THIS STANDARD OF ADEQUACY** is expressed in the form of the Red Seal Specifications adopted by this organization and approved by The Society for Electrical Development. It represents, therefore, the combined judgment of men experienced in gauging electrical requirements.

**AND THIS DOCUMENT** is a **CERTIFICATE OF CONFORMITY** to the requirements set up by the above standard of adequacy in the form of the Red Seal Specifications.

**IT IS EVIDENCE** that the electric wiring in the building located on premises described below provides facilities, such as convenience outlets, lighting outlets, switches and other essentials for the convenient use of electric service in conformity to the Red Seal Specifications of

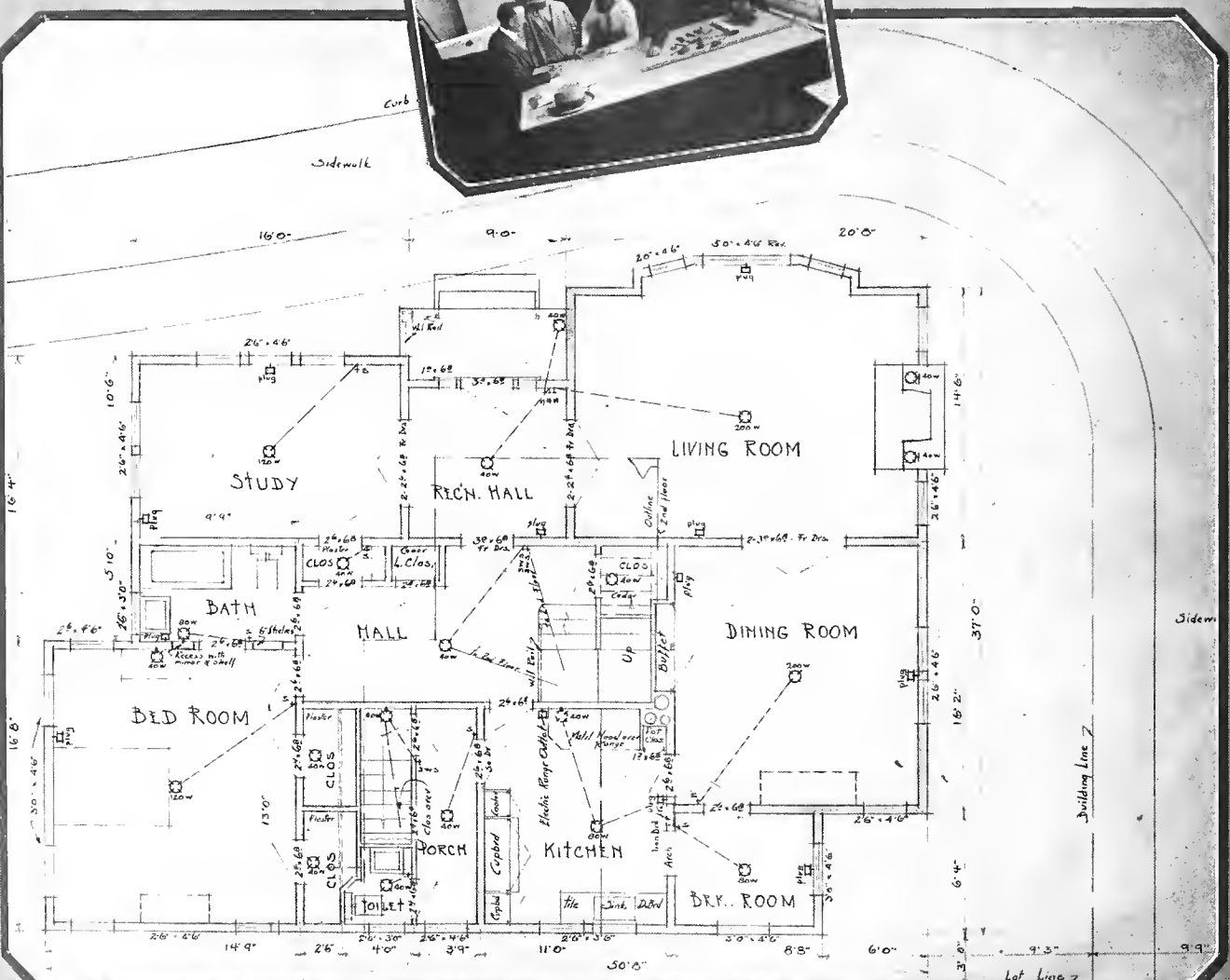
### California Electrical Bureau

operating, in this community, the **NATIONAL RED SEAL PLAN** to Assure Adequate Wiring for the Convenient Use of Electric Service in the Home, under license issued by The Society for Electrical Development.



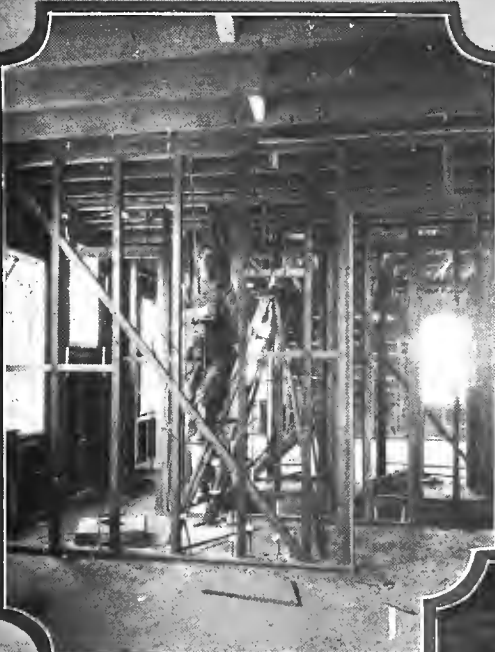
Certificate No. \_\_\_\_\_ Date \_\_\_\_\_  
Premises at \_\_\_\_\_  
City and State \_\_\_\_\_

Executive Secretary

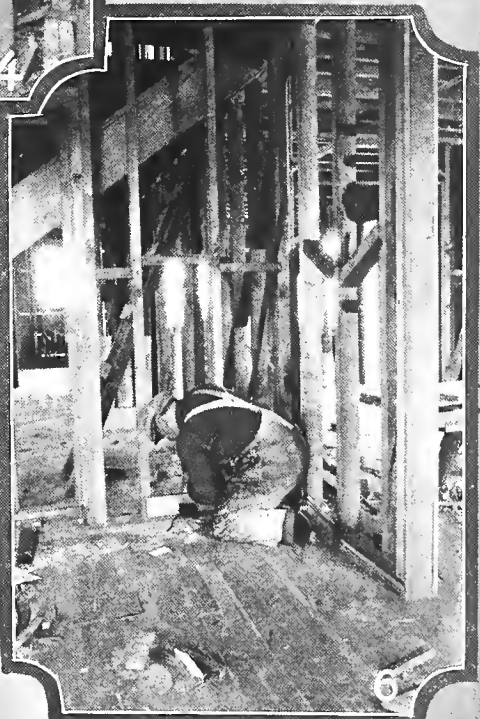


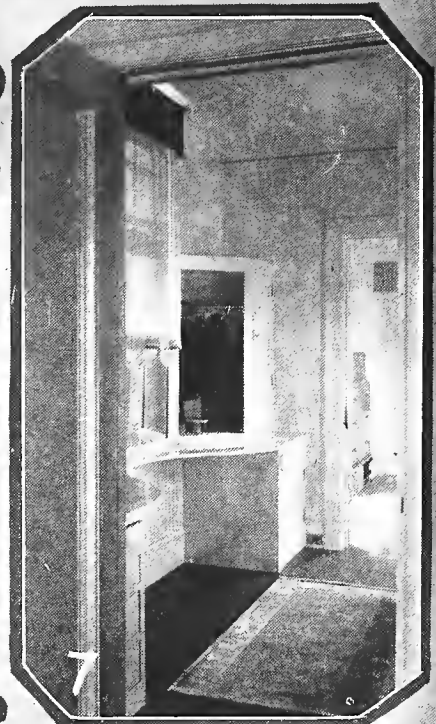
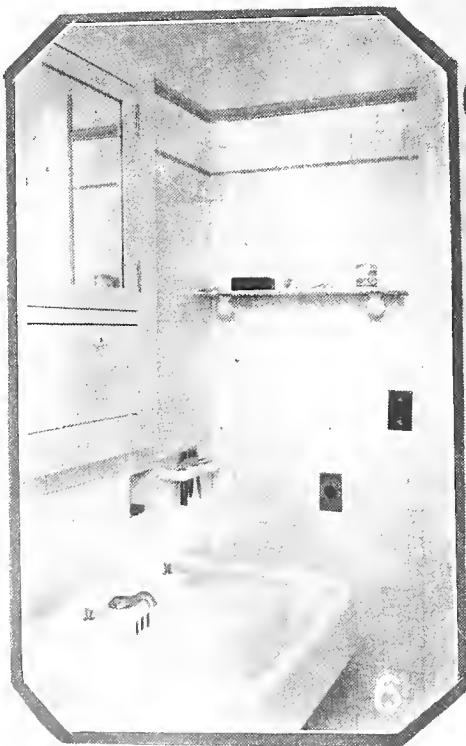
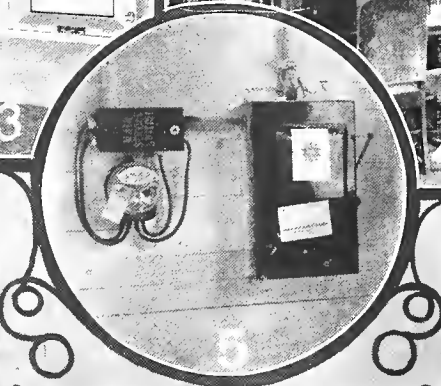
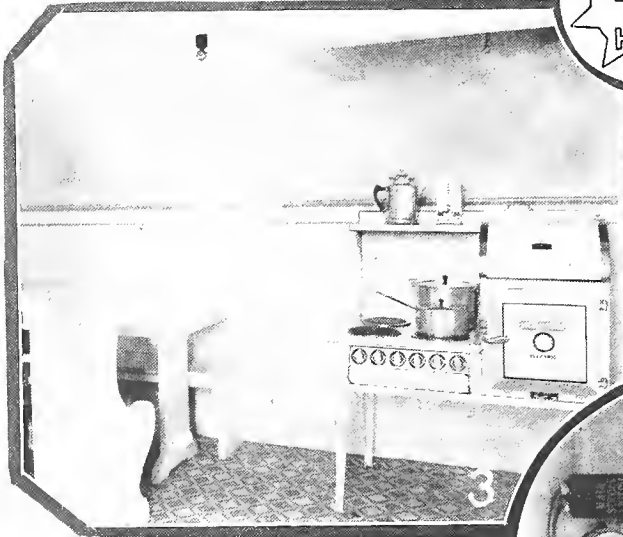
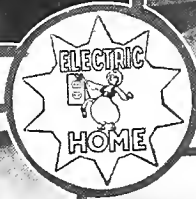
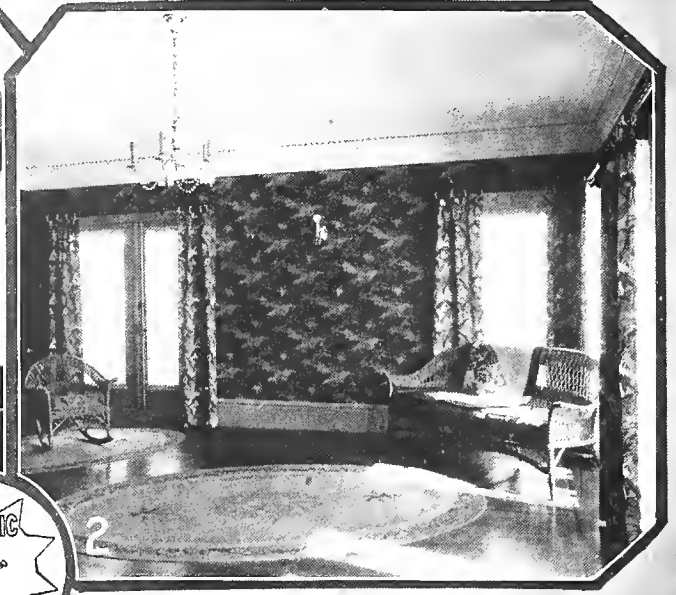
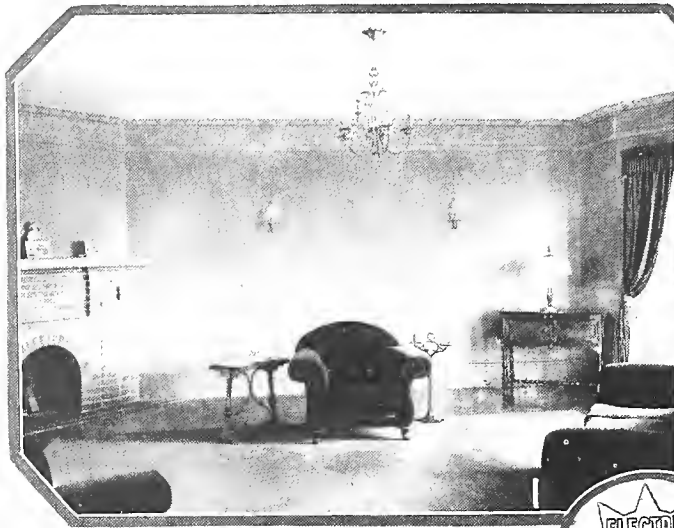
Mrs. Homeowner meets with her architect, the electrical contractor, and the representative of the California Electrical Bureau to lay out plans which will entitle her home to the Red Seal certificate shown above.



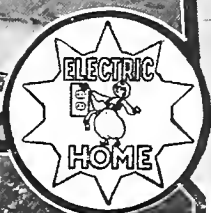


**W**IRING the Red Seal home comes next. (1) Wiring to the lighting control panel. (2) Where the service is brought in through conduit to the panel board. (3) The Red Seal home at the roughing in stage. (4) The crux of the situation — the range outlet in the kitchen. (5) The bath room outlet, called for in Red Seal homes. (6) An extra outlet in the dining room.

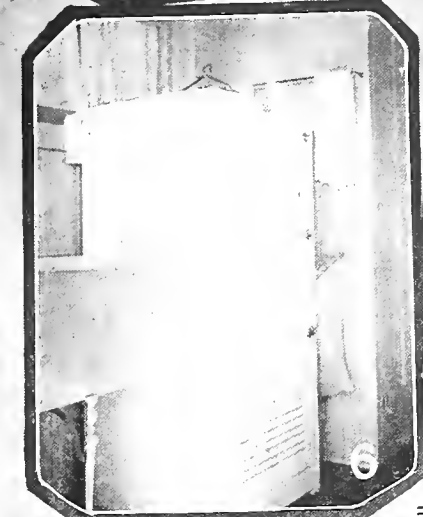
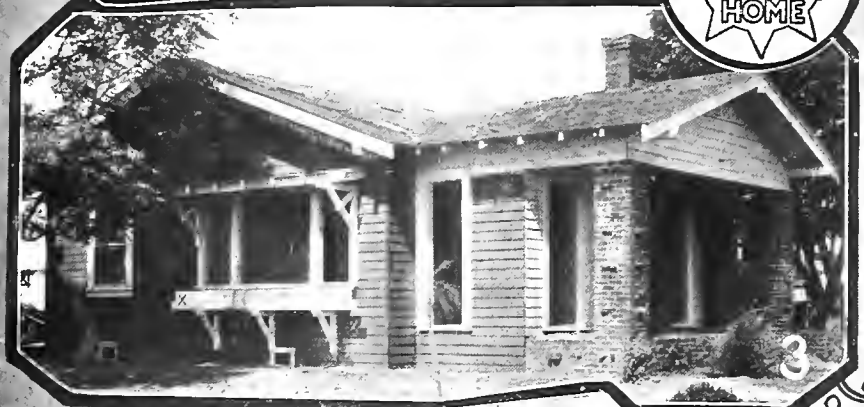




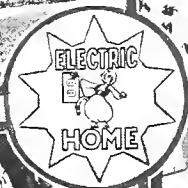
**T**HE completed Red Seal home, ready for the occupancy of its satisfied home owner. (1) The adequately lighted living room, with convenience and radio outlets. (2) The sun room on the second floor has convenience and radio outlets, too. (3) The Red Seal kitchen with its electric range and outlet in the breakfast nook. (4) The dining room has two convenience outlets, one on each side. (5) "The Symbol of an Adequately Wired Home"—the Red Seal on the meter switch. (6) Bathroom electrical comfort provided by this outlet. (7) Even the dressing room and clothes closet in this home are provided with an outlet and the bed rooms on each side are likewise served by outlets and adequate lighting.



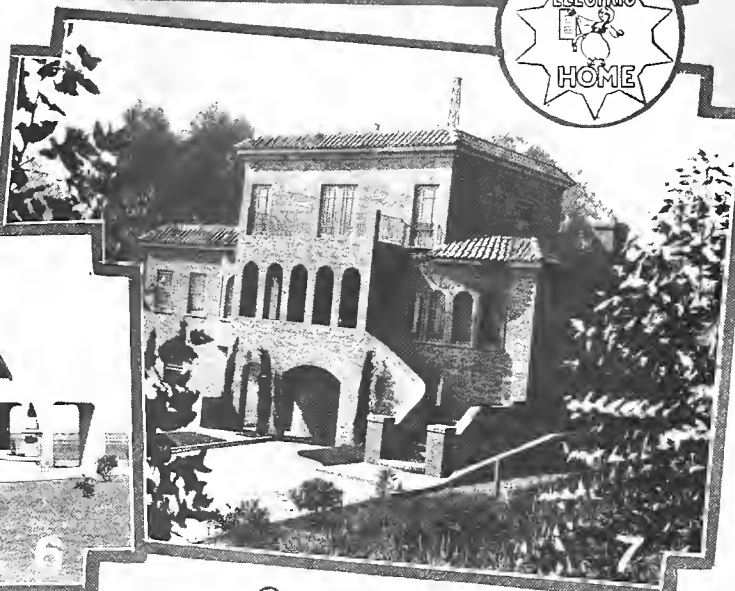
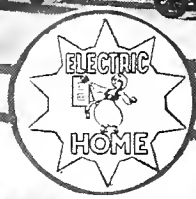
MODEST homes are these, but none the less Red Seal. The Red Seal specifications are adaptable to any home built, from finest mansion to humblest cottage. On this page are a group of modest homes, the homes which, because without servants, need Red Seal convenience the most. (1) A convenient kitchen, with its electric range side by side with the kitchen cabinet. A convenience outlet above the range provides still greater possibilities. Photographs 2, 3, 4, 5 and 7 are of homes in various parts of the West. (6) Shows the latest electrical servant, the electrical refrigerator on the service porch of a Red Seal home.



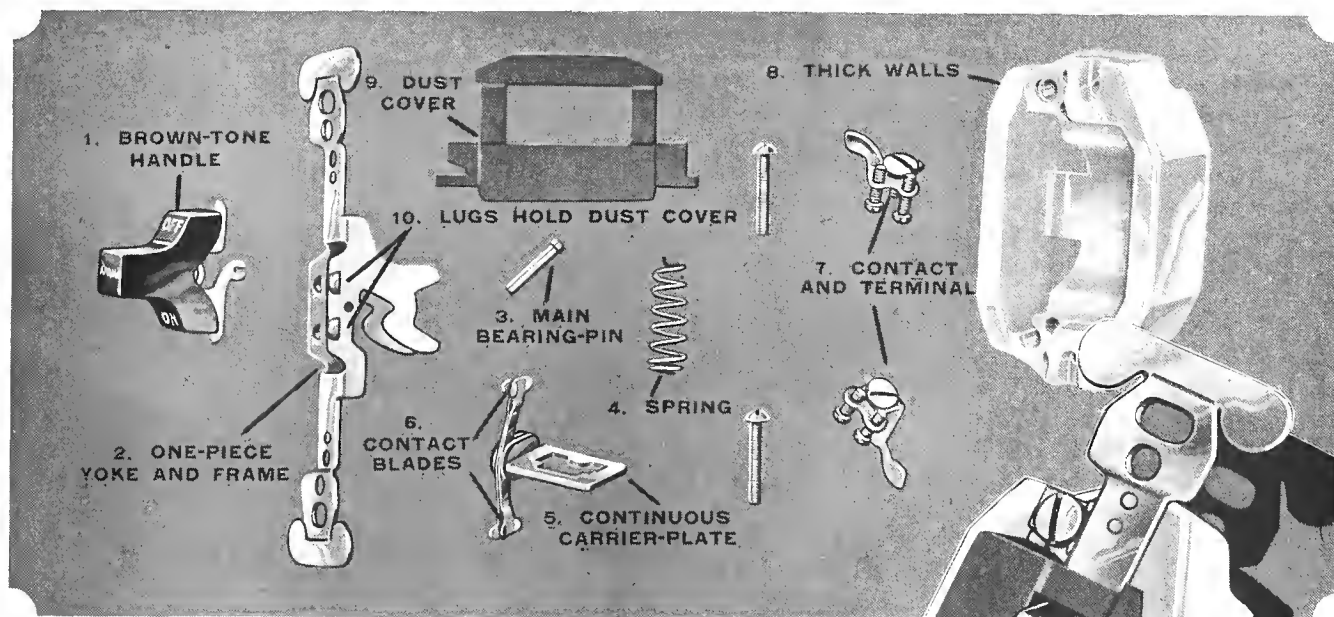




**M**ANSIONS, too, may be Red Seal homes. Grouped on this page are photographs of more lavish Red Seal homes throughout the West. That shown in Fig. 2 was originally planned to have 60 outlets, but now will have 204 to provide Red Seal adequacy. Fig. 3 shows a row of Red Seal homes being built in one of the newer tracts in San Francisco. Several such tracts are being planned in various parts of the West.







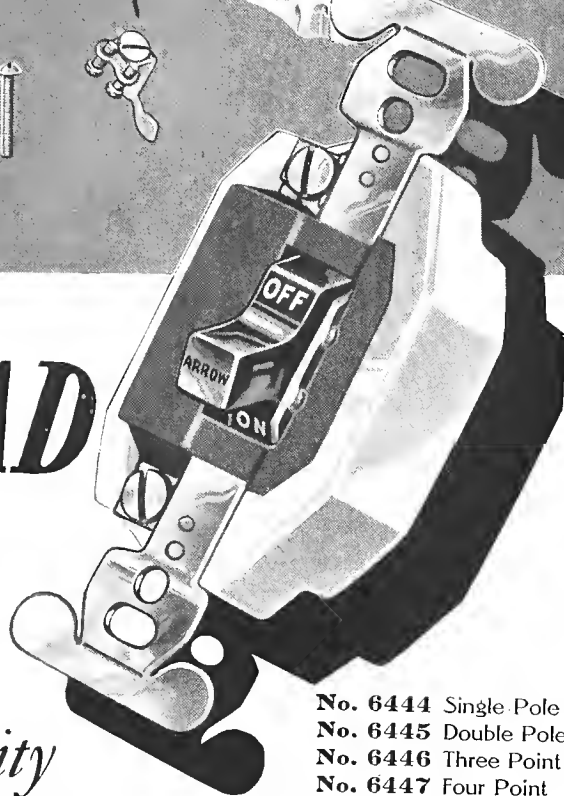
# ARROW HEAD SWITCHES

*An Achievement*

*Features in Simplicity*

1. Brown-tone handle matches either brass or molded plates. Direct kick-off and positive indication.
2. Combination yoke and frame, one piece. Eliminates parts. Plaster ears position switch and save installation time.
3. Main bearing-pin permanently fastened when assembled.
4. Self-supporting spring for long life and smooth action.
5. Continuous carrier plate. Always in alignment.
6. Contact blades of heavy bronze clamped to assure perfect contact.
7. One-piece contact and terminal held in positive position by two screws.
8. Thick walls prevent breakage.
9. Dust cover, securely fastened by lugs on frame, protects the mechanism.

No. 6444 Single Pole  
No. 6445 Double Pole  
No. 6446 Three Point  
No. 6447 Four Point



Tear Here

*We are interested. Please send a new  
Arrow-Head Switch.*

— *A New Development* —  
**ARROW**



THE ARROW  
ELECTRIC COMPANY

*The complete line of Wiring Devices*

HARTFORD,  
CONNECTICUT

# FLUSH H & H SWITCHES



## Their Long Life Saves the Life of Competitive-price Wiring Jobs

FRIENDLY Switches — they back you up when you're up against the low-bid jobs. Help you in keeping down to a price without cutting down the permanence of your work.

NUTMEG "Push" you know of old; its low price has never denied you dependable *mechanism*. Its sturdiness, through the years, has been priceless.

For your newer needs in a *Tumbler*:—8601 Square; sister switch to NUTMEG. Like NUTMEG it stands at the head of its price-class, because it stands out from that class mechanically.

These switches couldn't help but share the craftsmanship in the H&H higher-priced jobs. So share it all you can in your *own* jobs.

**THE HART & HEGEMAN MFG. CO. HARTFORD, CONN.**  
*Makers of Electric Switches since 1891*

**Red Seal** - *the Symbol of Adequate Wiring*  
**Bryant** - *the name of superior wiring devices*  
*a combination that means*  
*Satisfied Customers and*  
**SATISFACTORY PROFITS!**

The Red Seal Specification is a welcome guide to home builder and architect in securing ADEQUATE wiring and outlet circuits throughout the house. Such specifications bring a new era of convenience to the user of electricity. The quality of this service is another matter. That depends largely upon the quality of the wiring devices that tap the circuits.

For nearly forty years the Bryant Electric Company has been building sockets, convenience outlets, switches and other wiring devices. Over four thousand different wiring devices are now made under the Bryant label and guarantee.

A little timely effort on the part of the electrical contractor with the architect or the home builder can assure a bigger business volume and more profits. Bigger business through recommending a three-way switch in the entry hall perhaps, double convenience outlets instead of single, additional outlets in the living room if you learn the furnishing scheme, and a Bullseye Switch plate for the basement stairs. Better business when you recommend the Bryant Superior Line of Wiring Devices. They will assure satisfaction from the wiring installation both to you and to the architect or home owner.

**BRYANT the Complete Line  
of Electric Wiring Devices**



(Reg. U. S. Pat. Off.)

**THE BRYANT ELECTRIC COMPANY**

1421 State Street, Bridgeport, Conn.

Chicago  
844 W. Adams St.

San Francisco  
149 New Montgomery St.

New York  
342 Madison St.



(Reg. U. S. Pat. Off.)

*The largest Plant in the world devoted exclusively to the manufacture of Electric Wiring Devices*



The Hubbell Tassel Pendant adds a new note of distinction to Hubbell Pull Sockets.

## That "subtle something"

"I never look at a Hubbell Product without sensing a subtle something about it that takes it out of the commonplace."

The man who made the above remark gave us something to think about. For that "subtle something" is a real something that we insist must go into all Hubbell Products and that we want everybody to understand.

It is:—*perfection in every detail.*

Hubbell Products reflect the working policy that animates our entire organization. And Hubbell Sockets are not an exception.

### HARVEY HUBBELL<sup>INC</sup> ELECTRICAL SPECIALTIES

BRIDGEPORT, CONNECTICUT, U.S.A.  
NEW YORK, N.Y. CHICAGO, ILL.

Pacific Coast Representative:  
GARNETT YOUNG AND COMPANY

San Francisco Los Angeles Seattle Portland



Standard  
Key



Electrolier  
Push



Standard  
Keyless



Electrolier  
Key



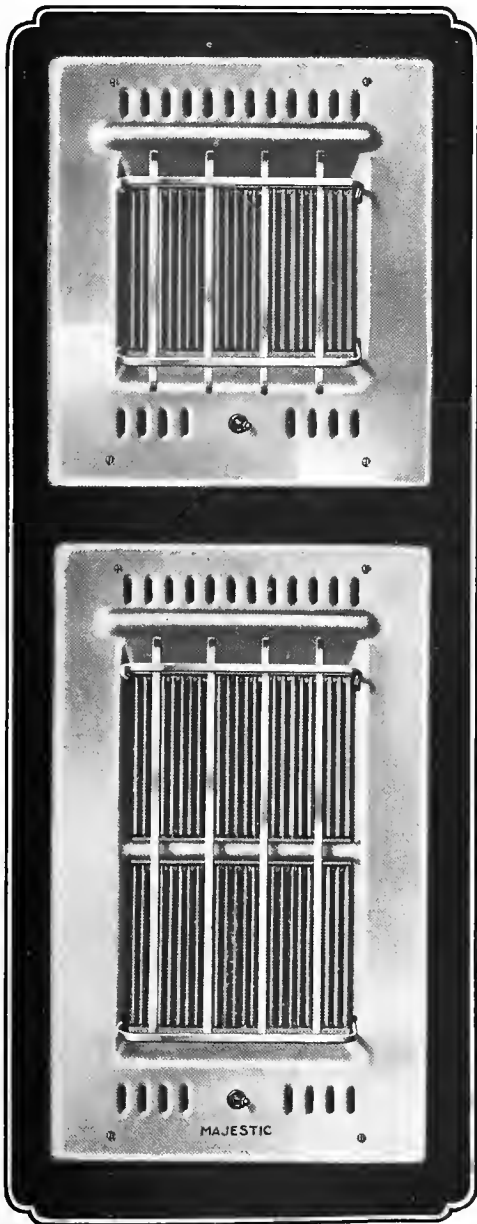
Electrolier  
Keyless



Electrolier  
Keyless-Short

# HUBBELL *Brass Shell Sockets*





*Every bathroom,  
new or old,  
is your field  
for this*

# *New* **MAJESTIC** *Electric* BATHROOM HEATER

Everyone in the electrical industry knows that a tremendous field exists for a built-in bathroom heater that is efficient, practical and inexpensive. The new MAJESTIC exactly meets these requirements.

Finished in white vitreous enamel and presents an exceptionally pleasing appearance. Will not catch dust or dirt. The element is not affected by water that may be splashed on it while in operation.

Made in 1000 watt and 2000 watt capacities, as illustrated. 1000 watt heater, \$25; 2000 watt heater \$30.

*Majestic products include a complete line of heavy duty heaters, both built-in and portable types, for homes, apartments, hotels and office buildings. Every Majestic Heater is scientifically correct in design and built to give a lifetime of practical, efficient service. Write for catalog.*

**MAJESTIC ELECTRIC APPLIANCE CO.**  
INCORPORATED

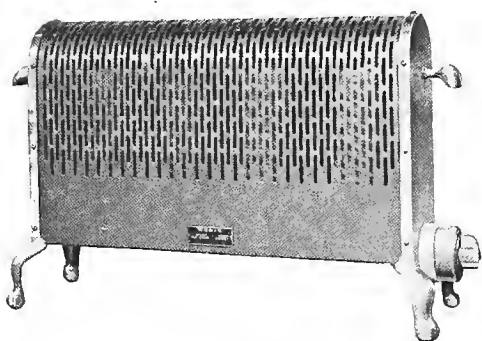
San Francisco

Kansas City

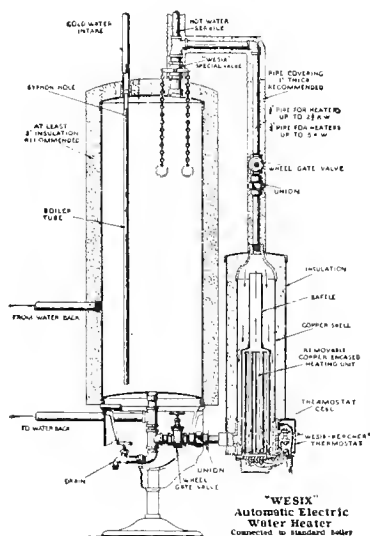
Philadelphia

# WESIX

*—unmistakably  
the BEST!*



WESIX Portable Heater  
Sizes 1 to 7 kw.

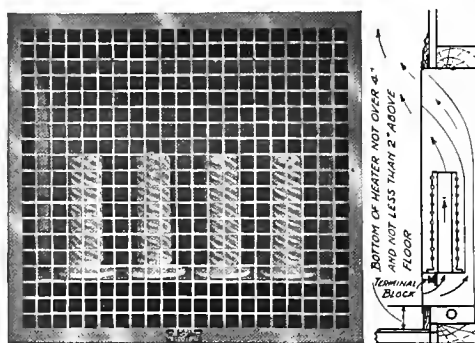


WESIX Three-Gallon Type Automatic Water Heater connected to ordinary boiler showing Wesix Patented System for controlling or limiting the amount of water kept hot.

When you sell Wesix Air and Water Heaters you keep all of the profits. For Wesix Electric Heaters do what is claimed for them—economically and dependably. They stay sold without periodical service calls that eat into your profits.

Unmistakably the Best, is a recommendation you can safely make for Wesix Electric Heaters. The best—for delivering a roomful or houseful of heat or an abundant supply of 160 degree water. The best, from the standpoint of proven scientific design.

If you encounter any difficult heating problems, get in touch with us. Our heating specialists are at your service. They can supply you with definite operating cost data on electric heating with Wesix Electric Heaters for hundreds of Western installations.



WESIX Radiant-Convection Wall or Fireplace Type (Patented)

*Write for Literature and Prices*

## SANDOVAL SALES CO.

115 Jessie St.  
San Francisco

4536 Hollywood Blvd.  
Los Angeles

# Links in the Red Seal Chain of Success!

## COLLYER

INSULATED WIRE COMPANY  
RUBBER COVERED  
WEATHERPROOF  
WIRES AND CABLES  
LAMP & SILK CORDS

WIRE

SAN FRANCISCO  
SEATTLE PORTLAND  
LOS ANGELES  
OAKLAND

YOUNGSTOWN  
SHEET AND TUBE CO.  
"BUCKEYE"  
BLACK AND GALVANIZED  
CONDUIT

CONDUIT

STEEL CITY  
ELECTRIC COMPANY  
LOCKNUTS - BUSHINGS  
SWITCH & OUTLET  
BOXES & COVERS

OUTLET  
BOXES &  
COVERS

TRUMBULL-VANDERPOEL  
ELEC. MANUFACTURING CO.

KNIFE & SAFETY  
SWITCHES

TUBULAR WOVEN  
FABRIC COMPANY

DURAX  
DURACORD  
DURADUCT

GENERAL  
PORCELAIN CO.  
"NAILIT" KNOBS  
ELECTRICAL  
PORCELAIN

SWITCHES

LOOM  
DURAX

PORCELAIN

**ALLIED  
INDUSTRIES,  
Incorporated**

**San Francisco  
Los Angeles • Oakland  
Portland • Seattle**

# *“In Unity There Is Strength”*

This is evident by the fact that there were 522 Red Seal homes built in California during the past seven months. A greater number by far than ever before.

## *The Red Seal Plan*

Provides a program whereby all branches of the electrical industry will co-operate for the good of each and all concerned. We're off with a wonderful start. Let everybody do his part.

More Red Seal Homes—



The P. G. and E. is lending financial assistance, enlists 10,500 employees, arranges window displays, runs ads in newspapers in presenting the Red Seal idea to 2,000,000 people in the territory served.

**PACIFIC GAS AND ELECTRIC COMPANY**

**P·G·and·E·**

**“ PACIFIC SERVICE ”**





# Seventy-two Red Seal Homes for the Garden of the Sun!

**E**LECTRICITY'S emblem of complete efficiency has won its place in the Valley of the San Joaquin. The Red Seal of approval is upon seventy-two homes.

To every contractor and dealer, to every architect, to every home-builder, we are telling the story of the Red Seal and its guarantee of adequate wiring. Our employees are missionaries of the gospel of the Red Seal.

This Valley is called "The Garden of the Sun," where life is pleasant and homes speak always of happiness and contentment. Happiest of all homes are those that are "Red Seal Specified" and most contented of all home owners are those who, under the Red Seal, know the daily joy of thorough electrical convenience.

**San Joaquin Light  
& Power Corporation**  
Fresno, Calif.

A. G. Wishon,  
President

A. Emory Wishon,  
Vice-President and  
General Manager

## The Red Seal Plan

Has Opened the Door to  
Greater Home Comfort  
and Convenience

The ever growing number of Red Seal homes in California proclaims the popularity of the Plan, and as building activity increases there is a wider field in which to spread the message of "home comfort and convenience." The organization of Great Western Power Company of California is co-operating in the united movement of the electrical industry to bring before the public the advantages of adequate electric wiring in every home. Intelligent effort is bringing success to the RED SEAL PLAN.



**GREAT WESTERN  
POWER COMPANY**  
OF CALIFORNIA

*Is the Red Seal Plan Expensive?*

**No!**

*the trouble is in our own minds*

If we have not been completely successful in selling "Red Seal" it is on account of mental hazards. Because we have been accustomed to selling \$50.00 jobs we go out with the idea that nobody wants a \$200 job. That is wrong.

**CONSIDER THIS**

A Complete Red Seal installation costs less than a medium-priced closed car.  
An electric range plus an electrical refrigerator costs less than a good piano.  
A washing machine costs less than a living room rug.  
A vacuum cleaner costs less than a phonograph.  
A full set of small appliances costs less than an overcoat.  
A convenience outlet costs less than a hat.  
Current to operate them all for a month costs less than a dozen golf balls.

**YET**

People buy cars, pianos, rugs, phonographs, overcoats, hats and golf balls by the thousand—they buy them almost automatically—BECAUSE they are convinced that these things are essential.

**WE MUST FEEL THAT THE RED SEAL IS ESSENTIAL**

We must get over the mental hazard that people cannot afford a complete electrical installation, that electrical appliances are expensive to purchase and expensive to operate. **THEY ARE NOT!**

**THE ELECTRICAL DOLLAR BUYS MORE IN CONVENIENCE AND  
SERVICE THAN ANY OTHER DOLLAR THAT  
THE CUSTOMER SPENDS**

People want "Red Seal." They are just waiting to be informed. It is up to all of us in the Electrical Industry to tell them—  
and sell them



**Southern California Edison Company**

# Merchandising Kilowatt-Hours in a Commercial Lighting Campaign

By V. H. Moon

Appliance Sales Superintendent, Pacific Power & Light Company, Portland

**B**EHIND the slogan "Profit with Light—Pay with Profits," the Pacific Power & Light Company went into a commercial lighting campaign which proved to be one of the most productive revenue building campaigns ever conducted by the company. The campaign was conceived in the belief that standards of commercial lighting throughout the small towns served by the company were far below what they should be; that these standards could be improved by offering the business men of the communities a simple plan for adequately lighting their places of business at reasonable expense; that this plan could be sold to the merchants on a business basis, that is, that it would produce business for them; that the sale of any appreciable increase in lighting load in stores would yield a material amount of revenue without adding a proportionate increase in investment necessary to serve it; and that if this revenue could be secured without too great a new business cost it would be extremely profitable to the company.

Of course, other and less tangible considerations entered into the conception of the campaign, touching its public relations and business relations aspects. It was thought that the business men of the towns would welcome the company's effort to give them good lighting advice, and that improvement in store illumination in the town would be applauded by the people at large as a civic asset. Furthermore, through securing the co-operation of the electrical dealers of the communities, the relations between the company and this class of business men could be improved.

## Planning the Campaign and Estimating Results

To reduce campaign expense of all kinds, it was determined to offer only one unit which would be adaptable to average conditions in most stores. The unit chosen was the 16-in. Trojan Glass of the Ivanhoe Regent Company, suspended on a bronze hanger of pleasing design made by the Miller Company. This unit could be used with either a 300-watt or 500-watt lamp according to spacing and conditions. To simplify the work of the salesmen, certain standards were established for minimum requirements. Two watts of lamp capacity per square foot

**A**LTHOUGH commercial lighting is a field that has been given considerable attention the campaign of the Pacific Power & Light Company described by the author is unique in many respects. Because the installations have been in for almost a year the author is able to offer some concrete data as to the effect on kilowatt-hour sales resulting from the sales efforts of the power company salesmen and contractor-dealers who participated in the campaign.

of floor space were recommended, which meant that if the units were spaced 12 ft. apart a 300-watt lamp should be used, and if 15 ft. apart, a 500-watt lamp. A minimum distance from the floor of 10½ ft. was recommended for hanging height. Ordinarily the new fixtures would be hung in the same locations as the old fixtures to save the customer all the expense possible, but in stores where this was impracticable a rewiring job would be recommended, and such job would be turned

over to a contractor-dealer thus helping interest these men in the campaign.

It was considered that 70 per cent of the stores on the company's system was inadequately lighted, and that, therefore, this represented the total possible number of prospects. Estimating that a certain percentage of these could be sold, and that the average installation would be four fixtures, a figure was arrived at as a possible goal to reach in the campaign. Again cutting this number, to be conservative, a quota of 1,000 units was established and apportioned amongst the fifteen districts in the proportion that the number of commercial customers in each bore to the total. Further estimates of average wattage increase, average hours use of the increase, and average rate on which this would be used, led to the estimate of \$7,200 increase in annual revenue from the installation of 1,000 units. Experience of other companies in campaigns of this kind, however, showed that approximately as many similar units were sold by the power company and dealers in the six months following the campaign as were sold during the campaign period, and if this ratio should be approached in the situation under consideration, this estimated revenue increase could be materially raised. It seemed reasonable to set the net results of a successful campaign at \$14,000 gain in revenue.

It was planned to use ten extra salesmen since the work was to proceed concurrently with another appliance campaign on which the regular salesmen would be engaged. The men available for the work had had no experience selling lighting, and so it was deemed necessary to give them some instruction before starting them out. Consequently a

week was set aside for a short course in lighting standards and practices, in selling illumination, and in company policies. Assistance in conducting this school was secured from A. T. Bergeron, Ivanhoe Regent Company, and E. M. Kerr, Pacific States Electric Company, Portland.

Another essential preliminary was to make available for display model stores, where the kind of lighting recommended to the prospects could be shown as a sample of what we were trying to sell. To accomplish this the company offered to one merchant in each town, without obligation on his part, to install in his establishment the kind of installation recommended, with the understanding that if at the end of the campaign period the merchant desired to leave it in he would pay the cost of it on the regular campaign basis. If on the other hand he chose not to buy the fixtures, they would be removed and his old ones installed without cost to him. Obviously the district managers picked carefully their prospects for this model installation, so that each developed into a sale as well as proving a valuable aid to the salesmen during the campaign.

#### Solicitation, Advertising, Dealer Co-operation

With ten men working in teams of two per district, it meant that the campaign could start in five districts simultaneously. These teams were required to solicit all the business houses in the district, turning in on special forms a survey of the situation as it was found in the store at the time of the solicitation and a report on whether a sale was made. During the solicitation representatives of the Ivanhoe Regent Company, Pacific States Electric Company and Edison Lamp Works circulated through the districts giving aid to the salesmen on particular jobs where it might be needed. When a district had been worked over, the team working it moved on to another, but returned to the first later in the campaign to close as many as possible of the remaining prospects. The campaign started Oct. 13, 1925, and was completed Dec. 16.

As an added stimulus to salesmen, who were paid a salary, \$250 in prizes was offered. This sum was divided into five \$50 prizes, each to be given to a team of two salesmen. Three were offered for the greatest number of fixtures sold by a team during different periods of the campaign, one for the entire campaign period, and one for the team selling the highest percentage of quota in any district. This division made it possible for more than one team to participate in the prize money and kept interest alive to the end.

The advertising was timed to precede the solicitation in each district by only a few days. Three broadsides were prepared for mailing to prospects at intervals of two days, with the last timed to reach the merchant two days prior to the salesman's call. The first of these, a large green folder, was entitled, "Why not employ tongue-tied clerks? You could probably hire them for less." It opened first to a page of large type urging that good light will help sell more goods. The inside was printed in smaller type, but still three times as large as or-

dinary typewriting, in the form of a letter in which the thoughts on the outside and the first inside pages were elaborated. The second was the same size as the first, printed on red, and brought out the thought that "More people buy by sight than are induced to buy by argument." The third, in yellow and black on white, was headed, "A Sensational Offer to Business Men," and contained a picture of the fixture offered and a complete explanation of the offer, featuring the slogan quoted at the head of this article. Only two newspaper ads were used: one just before the campaign opened in each town as an announcement, and one run about a week before the campaign was to close, urging the merchants to take advantage of the offer and printing the names of those that had done so up to the date of the advertisement.

The fixtures were offered to customers completely installed with the proper size lamp at \$12 cash or \$13 on terms of \$1 per unit down and \$1 per unit per month. If any wiring had to be done to secure the best spacing, the company turned this business over to one of the contractor-dealers of the town, recognizing the preference of the customer, added the amount of the wiring plus 10 per cent to the amount of the fixture bill, and carried the account for one year at equal monthly payments. In such cases the company paid the dealer in cash on completion of the job the amount of his contract. Thus a considerable amount of wiring was created for the dealers, and in addition to this means of securing co-operation from them, the company furnished them with a stock of the same fixtures sold by the company, urging them to make sales on their own accounts, for which they were allowed \$3.50 per fixture sold and installed. Where a dealer made the installation of fixtures sold by the company he received \$1 per fixture. Further, the company carried the accounts of all jobs sold by the dealers on time, paying the dealers their cash commissions on completion of the installation. This policy resulted in securing satisfactory co-operation from most dealers as is evidenced by the fact that dealers were credited with 31 per cent of all the fixtures sold during the campaign period.

#### Results

It was realized in planning the campaign that in merchandising fixtures the company could not expect a profit, that is, that the expense of selling 1,000 or more fixtures would be greater than the gross receipts from the sale. But it must be remembered that the intent was to sell kilowatt-hours, and consequently, the test of the success of the campaign would be in determining what was the cost of securing the revenue added. There were actually sold during the campaign 1,374 units, adding 235.61 kw. net additional load. The cost of the campaign over and above receipts from the sale of fixtures was \$3,369.54, representing \$14.27 per kw. added. Using the same multiplying factor for the number of hours use during the year, as was applied to the estimate at the commencement of the campaign, this would mean the consumption of



283,000 kw-hr. Applying to this consumption, then, the average rate per kw-hr. received for this class of business, we get the expected additional annual revenue, and find it to be well worth the expense incurred in securing it.

By checking up to see how close actual results will approximate estimated ones, a record has been kept of the 65 customers in one town sold during the campaign. These customers bought 260 units adding 31.9 kw. to their total load. The campaign ended in this town about meter-reading time, De-

district, by the simple rule of three we may expect 412,000 kw-hr. from adding 235.61 kw. over the entire system. Even though there prove to be influences in other districts which will tend to bring the total increase below 412,000 kw-hr. as figured from the situation in the test town, nevertheless it is not likely to be less than 283,000 kw-hr. as estimated, and, therefore, it would seem that early estimates were sufficiently conservative and that actual increased revenue will greatly exceed expectations. Furthermore, the impetus given to better

## PROFIT WITH LIGHT ~ PAY WITH PROFITS

**That is exactly what we offer  
We will light your place of business  
RIGHT—just as you have always  
wanted it and you pay for it in a  
year out of the increased efficiency**

This printed letter deals with something that concerns you very closely—the problem of getting more customers into your store, and selling more goods.

The key to that problem is your store lighting. Bring the lighting up to a business-getting level and you'll see astonishing results.

Enough light for mere seeing is common to all stores; but only three out of every ten stores as an average have enough light for selling!

The question is—is your store one of the seven that do not have the kind of light that attracts trade and sells goods? You can't tell—you can't be sure until you have had your lighting tested.

Have this test made! You can easily get the facts by

accepting the free service offered on the attached card.

Let one of our representatives come to your store and show you just exactly what kind of illumination you now have, and what kind you should have.

### You Have Everything to Gain

This will cost you nothing—not oblige you in any way. And it may be the means of helping you to a mighty substantial increase in sales and profits. We will not recommend new equipment unless we are absolutely certain it will be profitable to you.

You'll never have a better opportunity to get the facts about your present lighting, and what better lighting can do. Mail the attached card today.

**T**HIS is the lighting fixture we are offering for a LIMITED TIME ONLY

GLOBE: Made by Ivanhoe, of efficient Genco glass. Properly diffuses and directs the light where you want it.

FIGURE: Made by Miller. The best that can be made.

An attractive and efficient lighting unit that turns raw light into pleasing, delightful illumination—the kind that sells more merchandise.



Pacific Power and Light Company  
City

**Yes!** You may look over our lighting and submit your recommendation, as a FREE SERVICE.

Name \_\_\_\_\_

Address \_\_\_\_\_

Contents of one of the three broadsides sent out during the commercial lighting campaign of the Pacific Power & Light Company.

cember, 1925. Thus a comparison of 1926 consumption and revenue of these 65 customers, with the consumption and revenue of the same customers in 1925, will give a fairly accurate measure of average results from the campaign. It is interesting to record, therefore, that for the first eight months of 1926 these customers have been billed for 154,497 kw-hr. as against 118,387 kw-hr. for the first eight months of 1925. The increase, therefore, up to the month of September, is 36,110 kw-hr., and since the last four months of the year are the months in which occurs the heaviest use of lighting, it is reasonable to suppose that the increase for the entire year will approach 56,000 kw-hr., and that the additional revenue received from this business will be ten times as great as the cost of the campaign in this town.

If, then, an increase of 56,000 kw-hr. annually is secured from adding 31.9 kw. of lighting load in one

store lighting has become apparent through the fact that other merchants have improved the lighting in their establishments since the campaign and so we are able to add to the direct revenue an indirect one not so easy to figure but none the less certain. When to these considerations is added the intangible benefit to public relations, it must be assumed that the campaign was highly successful and amply justified its cost.

A Memorial to George Westinghouse is to be erected in Schenley Park, Pittsburgh. The theme of the commemorative work is planned to be the figure of an American youth standing in a parked space with his eyes fixed upon the granite medallion of Mr. Westinghouse and its flanking panels carrying figures representing, respectively, the genius of enterprise and the genius of engineering. Other panels will depict the inventor's achievements.

# Commercial Possibilities of the Residential Customer

CENTRAL station executives have been inclined to view with a certain degree of complacency and satisfaction an annual report which shows an increase in the number of domestic consumers served of from 8 to 12 per cent. Insofar as the Western states are concerned this percentage of increase cannot hold for many more years for the simple reason that the percentage of wired homes is reaching the maximum and the number of new homes due to normal growth will fall considerably short of this figure. Conceivably the time has arrived when thought must be given to the low return on the investment in residential service relative to that in other fields and to the steps which must be taken to cultivate the residential field with the view of deriving from it the maximum revenue which it affords. Increased residential consumption alone will bring about the desired results.

Recent national surveys have brought out the fact that the average home consumes 365 kw-hr. per year or one kilowatt-hour per day, for which it pays an average of \$27.89. Furthermore the fourteen and a half million residential customers consume 9 per cent of the total energy generated by central stations and contribute 28 per cent of the total gross revenue. Obviously a very slight increase in the average annual kw-hr. consumption of the home will have a marked effect upon gross revenue and a correspondingly greater effect upon net revenue. It is apparent also that the home is not making the greatest possible use of the service which electricity offers.

The field which the home offers may be divided into three general classifications. The primary function of electricity in the home has been the furnishing of light. More and better lighting then may be set down as the first aim of a central station in dealing with its domestic consumers from a new business standpoint. The second new business possibility is in the increase in the number and variety of lamp-socket appliances. The third and last classification includes the heavy duty appliances such as the refrigerator, range, water heater and finally air heating. It is the purpose of this article to deal with the first and third classifications. The second is discussed in another article in this issue.

***THE two million residential customers on the lines of the western power companies present an attractive field for the development of new business which has not been cultivated to the extent it deserves. The average annual consumption for all homes in this territory is less than the national average. Individual companies, however, report average annual residential consumptions of more than 500 kw-hr. This article discusses residential consumption and the effect of adding various appliances to the home.***

The fact that lighting is a requisite in the American home and the public has had to come to the central station for this service rather than to wait to be sold by the utility's commercial department, offers some explanation for the poor standard of lighting that exists in the majority of homes. It is true that little or no attention has been given by the new business departments to the lighting of the home. This is supported by the results of a survey conducted by the Home Lighting Committee of the National Electric Light Association. Several years ago

this committee established a conservative ideal, representing the minimum requirements of lighting equipment to provide adequate and convenient lighting for the average home of six and one-half rooms. These requirements were as follows:

- 10.5 convenience outlets.
- 11.5 ceiling fixtures.
- 8 utilitarian brackets.
- 8.5 portable lamps.
- 1845 watts of connected lighting load.

Surveys based on the results of the home lighting contest show the average condition of the home to be as follows:

- 3.4 convenience outlets.
- 8.6 ceiling fixtures.
- 2.5 utilitarian brackets.
- 2.8 portable lamps.
- 954 watts of connected lighting load.

Present conditions compared with conservative recommendations show that the total wattage of connected lighting load at least should be doubled; the number of convenience outlets at least should be trebled; the number of portable lamps at least should be trebled; many of the sockets should contain lamps of higher wattage.

These surveys show further that of the lamps now existing in the homes 29 per cent are smaller than 40-watt; 52 per cent smaller than 50-watt; 80 per cent smaller than 60-watt. If a campaign were to be conducted by a new business department for the purpose of increasing the wattage alone of the present lamps in the home, the average annual

gross revenue due to the replacing of smaller sizes would be increased as follows:

- 9 per cent if 40-watt lamps were used.
- 19 per cent if 50-watt lamps were used.
- 34 per cent if 60-watt lamps were used.

Although many merchants outside of the electrical industry have seized upon the portable lamp as a satisfactory article of merchandise, little or no attention has been paid to this device by the ma-

representative residential accounts before and after the installation of the kitchen lighting units are as follows:

Average yearly consumption of 100 representative residential accounts prior to the installation of the kitchen-lighting units.....	256 kw-hr.
Average yearly consumption of 100 representative residential accounts after the installation of the kitchen-lighting units.....	323 kw-hr.
Average yearly gain.....	67 kw-hr.
Average yearly revenue gained at 5 cents per kw-hr. ....	\$3.35
Average monthly consumption prior to the installation of the kitchen-lighting units.....	21.4 kw-hr.
Average monthly consumption after the installation of the kitchen-lighting units.....	27 kw-hr.
Average monthly gain.....	5.6 kw-hr.
Total gain.....	26%

Table I.—Effect of Range on Consumption of Ten Consumers in Boise, Idaho

	Kw-hr.
Consumption ten lighting and appliance customers for 12 months prior to addition of range.....	6,737
Consumption for lighting and appliances only for ten consumers after addition of range.....	6,015
Consumption for ranges only for same ten customers.....	18,518
Total consumption for lights and range for ten customers for 12 months .....	24,533
Average annual consumption before addition of range.....	673.7
Average annual consumption after installation of range.....	2,453.3
Increase in consumption due to range.....	1,779.6

jority of central stations. A national survey shows that power companies that have conducted portable lamp campaigns in which a total of 115,000 lamps was sold have enjoyed an average increase of 11 per cent in the annual average gross consumption

From these widely scattered examples of the effect of salesmanship upon lighting of the home, it is obvious that this field offers attractive commercial rewards. These rewards are even more attractive when it is called to mind that any increase in annual gross revenue brought about by added consumption in the home for lighting is immediately reflected in an even greater percentage of increase in the net revenue. The sale of convenient, proper and adequate lighting in the home is a field not to be overlooked by new business departments.

Table II.—Consumption and Average Revenue for Domestic Consumers in Spokane, Wash.

Year	Kw-hr. Consumed	Revenue per Year
1920.....	372	\$19.35
1921.....	434	21.10
1922.....	462	22.80
1923.....	528	23.90
1924.....	527	25.10
1925.....	565	26.10

If the problem of the light and power industry with respect to its residential consumers is one of increasing annual consumption, hence the gross net revenue and finally the return upon the investment to serve these customers, then the electric range and the electric refrigerator are two appliances which offer attractive possibilities.

of the home. It was found that the average consumption of the portable lamp was 40 kw-hr. per year. A 200-watt portable increased the average annual consumption 18.2 per cent, or 66.5 kw-hr.

Dealing first with the electric range and giving no consideration to the subjects of load factor demand and diversity factor, because these have been fully covered in the 1926 report of domestic cooking and water heating committee of the National Electric Light Association, some figures will be offered on the effect of range sales on domestic consumption and gross revenue of some of the large Western power companies where the greatest range sales activity has taken place.

Table III.—Kw-hr. Consumption for Lightin only, Lighting and Cooking, and All Classes of Residential Consumers on Lines of Western Central Stations.

Year	No. of Customers			Annual Av. Kw-hr Consumption	
	Lighting	Dom. Pow.	Total	Lighting	Dom. Pow. Tot. Sys.
1922.....	43,731	1,529	45,260	340	1,276 372
1923.....	47,793	1,890	49,683	340	1,263 375
1924.....	67,119	3,676	70,795	345	1,294 394
1925.....	77,925	5,436	83,361	383	1,246 439

Kitchen lighting campaigns which have been so successfully conducted by a number of central station companies have proved a desirable means of increasing residential consumption. A national survey shows that 60 per cent of ceiling fixtures in kitchens are obsolete. They contain an average of only 63 watts. Modern kitchen lighting units are readily sold with a 100-watt to 150-watt lamp. Reports to the lighting committee of the National Electric Light Association from companies which have sold a total of 500,000 kitchen units show that the average annual increase in consumption in the home is 14 per cent as a result of this installation.

Table I shows the kw-hr. consumption of ten lighting customers selected at random on the lines of the Idaho Power Company, both before and after the installation of an electric range. The increase in consumption due to the addition of the range was 1,779.6 kw-hr. per year, or 264 per cent.

These figures are further borne out by the results of a check made on the lines of several utilities of the Pacific Northwest where kitchen lighting units were sold. The results from an analysis of 100

Table II shows the average annual kw-hr. consumption and revenue per year for the residential accounts of the city of Spokane, as taken from the records of The Washington Water Power Company. This company has followed a consistent range merchandising policy and at the present time approximately 20 per cent of its domestic consumers are electric range users.

Table III is an analysis of residence lighting and domestic power accounts on lines of another large Western power company for the four-year period of 1922-1925. This company also has been a consistent range merchandiser. Although figures for the average consumption are higher than the na-

tional average, the gross revenue is lower on account of the considerably lower rates in effect on its system.

Developments in domestic electrical refrigeration have been so rapid that complete records of a large number of consumers on the lines of any individual company are not available. While it has been generally conceded that an electric refrigerator will bring about an increase in the average domestic consumption of from 300 to 360 kw-hr. per year, figures from the Utah Power & Light Company, as

throw switch is not desirable as there is a marked increase where this use-limiting device is not included.

Conceivably, the maximum domestic consumption will result from the home with, first, adequate lighting, second, electrical refrigeration, and, third, range and water heater and finally, electric air heating.

Table IV shows the kw-hr. consumption in eleven homes in the city of Seattle for the year 1925 as furnished by the Electric Heating & Manufacturing Company. In this table the consumption of the water heater is not included as these are on a flat rate and the energy consumption is not metered. In installations where water heaters of an average capacity of 1 kw. are served on a flat rate the consumption will average approximately 650 kw-hr. per month unless the water heater is connected to

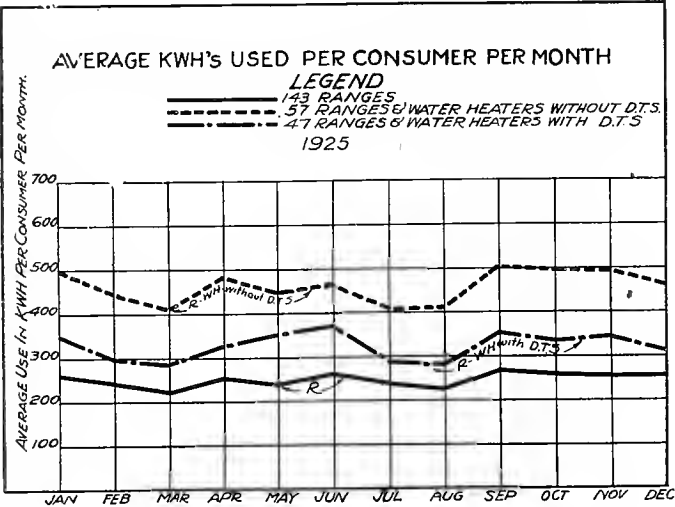


Fig. 1

shown in Table IV, indicate that this may be higher. At any rate the domestic electric refrigerator is a desirable appliance from the standpoint of increased consumption.

While there is a wide diversity of opinion as to the class of water heating service to be sold to the home, particularly with reference to the capacity of the heater, Fig. 1 is offered to show the effect of water heating upon the lines of the Western States Gas & Electric Company. The average use of kw-hr. per customer per month for ranges, ranges and water heaters on a double throw switch and ranges and water heaters without a double throw switch, is shown in this chart. The chart also indicates that from the standpoint of consumption alone, with no reference to demand, the double

the range with a double throw switch. In such cases the consumption will be considerably less. At any rate there exist on the Pacific Coast homes in which the average monthly consumption is in excess of 2,000 kw-hr.

The examples cited in the preceding paragraphs indicate that the residential customer offers a rich field for increased consumption. With the increased sales consciousness which the industry is showing it is conceivable that considerable sales effort will be exerted for its maximum development.

Table IV.—Effect of Monthly Residential Consumption Due to Addition of Electric Refrigerator, Utah Power & Light Company

Month	No. of Customers to Get	Cus-tomers used Av.	Av. Consump-tion Lights and Range 12 months before Installation of Refrigerator Kw-hr.	Av. Consump-tion Lights, Range and Refrigerator after Installa-tion of Latter Kw-hr.	Av. Consump-tion of Re-frigerator Alone Kw-hr.
January	27		317	382	65
February	27		267	322	55
March	27		258	308	50
April	27		259	346	37
May	27		273	301	28
June	27		266	316	50
July	15		192	278	95
August	15		180	319	139
September	18		227	310	33
October	24		269	337	68
November	27		278	372	94
December	27		291	351	60
Average			256	329	73

Table V. Kilowatt-hour Consumption of 11 Seattle Homes Using Electricity for Cooking and Heating

House No.	110	111	112	113	114	115	116	117	118	119	120
Rooms.....	6	6	6	8	8	8	8	8	9	9	9
Stories.....	1	1	1	2	2	2	2	2	2	2	2
Registers.....	9	7	6	20	16	12	12	11	15	15	16
Heating Load.....	20	15	15	34	35	22	25	25	31	32	38
Electric Range.....	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Electric Water Heater.....	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Water Heater on Meter.....	No	No	No	No	No	No	No	No	No	No	No
Vacuum Sweeper.....	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Washing Machine.....	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Lights.....	26	22	28	48	136	44	50	56	46	62	40
Monthly Kilowatt-hour Consumption											
February.....	1,495	2,275	1,625	1,020	1,820	2,090	3,212	3,360	3,380	4,140	1,820
March.....	1,060	1,365	1,400	785	1,550	1,170	2,338	3,100	2,660	4,105	1,680
April.....	510	845	1,625	2,280	1,250	2,630	2,258	3,560	2,150	1,370	3,345
May.....	195	505	1,200	1,290	160	2,700	1,479	2,690	2,130	1,210	3,050
June.....	305	100	470	360	225	790	1,022	370	925	1,275	1,240
July.....	145	108	200	210	280	460	801	105	445	1,215	235
August.....	360	145	170	180	145	16	441	270	625	720	402
September.....	700	45	370	305	400	95	893	430	425	495	730
October.....	870	1,130	400	1,875	770	1,330	1,000	510	955	1,775	2,280
November.....	1,620	920	1,420	2,670	1,890	2,280	1,415	1,820	1,802	2,965	3,790
December.....	1,690	750	2,140	1,470	2,890	2,140	1,608	3,440	3,295	3,835	4,780
January.....	1,810	2,920	1,820	1,390	2,850	3,520	2,988	2,960	2,765	3,225	3,550
Average.....	888	926	1,070	1,152	1,118	1,664	1,622	1,885	1,796	2,190	2,241
Monthly Average Bill.....	\$12.72	\$14.23	\$14.40	\$15.20	\$15.34	\$20.04	\$20.20	\$20.85	\$22.41	\$26.29	\$26.63



# Power Company-Dealer Co-operation in Appliance Merchandising

By O. N. Robertson\*

Chairman, Merchandising Section, California Electragists, Southern Division; President, Robertson Electric Company, Santa Ana

THE need of the hour for the electrical industry is more sales volume in electrical current-consuming devices. We are faced today for the first time with the fact that power companies have more kilowatt-hours to dispense to the consumer than they ever have had, and throughout the country today more interest is being taken in developing highly trained organizations for the purpose of acquiring new business at almost any price. Therefore, the Electragist merchandisers of California through their organizations are presenting this report as a constructive help in solving this problem confronting the industry today.

This report is the combined effort and thought of the Merchandising Committee of southern California and merchandisers from the north. In it we hope to set down the method which we as Electragist merchandisers believe is the most economical way of forcing the sales of electrical appliances. This method calls for closer teamwork on the part of all branches of the industry.

It will take the combined efforts and best plans of every branch of the industry to bring about in the next five or ten years the complete electrification of the home. It is going to take teamwork on the part of every branch of the industry to develop the use of electricity to an equal place with the development of the making of electricity in California where financing and engineering genius have played such a prominent part.

It is quite apparent, as we see it, that in the development of the central station and the electrical business as well, there was first an era of pioneering. Now we are in an era of expansion of lines and equipment, of consolidation, and of restricting expenses, to meet the present load demand. In the near future we shall have the era of merchandising. Are we going to be ready for it? What are we going to do to be organized and ready to promote and maintain the era of merchandising that is to come? Those who have watched the trade magazines have become impressed with the large amount

**WITH merchandising and load-building the paramount issues before the industry today the report of the Merchandising Section of the California Electragists in which a plan is offered for co-operative appliance selling is exceedingly timely. The report states the position of the contractor-dealer with reference to appliance merchandising and outlines a plan whereby teamwork on the part of the four branches of the industry will bring about greater distribution of current consuming devices.**

of open territory available for the sale of current-consuming devices. The most popular appliance we have today, the one which we think least of, and yet it would be hardest to deprive a housewife of, the flatiron, is yet to be sold to 30 per cent of the market of the United States. In California the market is supplied practically 100 per cent. The next popular appliance, the toaster, is used in only 27 per cent of the homes. When we get on down to the larger current-consuming devices, such as refrigerators, ironers and electric ranges, only one-

half of one per cent to 3 per cent of the markets are supplied. The mountain is gigantic. It will take years to tear it down to a flat plain. We can never attempt to scale the mountain or go into its depths unless we have organized effort on the part of manufacturers, central station, jobbers, and the dealers.

The guiding men of our industry today are realizing this very fact, and are placing more emphasis on it every day. John Gilchrist, vice-president of the Commonwealth Edison Company of Chicago, very recently made this statement: "The jobber and dealer I think will surely become more, rather than less of a factor. The prices of sales, particularly of appliances, are on a much better plane now than they were a few years ago. Margins to cover cost of sales have been widened very radically, and we will, I believe, see a great force of people, other than utilities, devoting time and energy to placing all kinds of appliances on the power companies' lines for pecuniary reasons of their own."

Yet we are faced with this proposition, and every one is familiar from experience with what we want to say. It is a known fact that the dealer department of a contractor-dealer's business has never been able, except in a few isolated cases, to make a profit or even break even after the year's work is counted and the cost scrutinized. The same capital and ability in other fields would have produced more profit for them. There have been many reasons for this. Often the dealer himself has been responsible to some extent, but not all. Internal economic conditions have been against him. How-

\* Paper presented as Report of Merchandising Section, California Electragists' Convention, Del Monte, Calif., Oct. 1-2, 1926.

ever, since we have increased discounts, which, though in some cases meant a raise in the list price of an article, the going has been a little easier. Down deep in the hearts of all men operating merchandising departments who will count the cost as it must be counted from an economic standpoint, is the knowledge that it has been practically impossible to make the merchandising department break even.

What do we mean by an accounting of the cost from an economic standpoint? We mean consideration of all the cost items in the selling of merchandise, be it a large or small establishment. We will list then those costs mentioned: management, occupancy, interest on investment, license and taxes, insurance, advertising, warehousing, sales expense, demonstrating expense, depreciation on shopworn and obsolete merchandise, depreciation on accounts receivable, miscellaneous, items such as telephone, light, heat, accounting, and last, and a very important item, service cost.

There is, therefore, a gap which seems impossible to jump, under present economic conditions, between the list price, or the price received for current consuming devices, and the cost of the article plus the sales and overhead expense involved in making a sale.

What are we going to do to pioneer our electrical merchandise in order to sell the consumer properly; in order to make a return on our investment, whether it be a power company's money or a dealer's money; to bridge this apparent impossible gap? Shall we raise the list price of an article? All hard-hearted business men know how volume decreases when a price is raised. What will make it possible to gain these objectives mentioned and give increased volume of business to the manufacturer, the jobber, the dealer, and to increase year after year the volume of electricity sold?

We believe that there is a way out which is being tried and successfully followed in one form or another by many companies throughout the country. It is only necessary to read the trade magazines to find out many of these plans that are followed by broad-minded central station merchandisers.

We feel that a plan whereby closer teamwork can be gained from a dealer, who is coming more and more to be recognized as a logical outlet for merchandise, should be considered.

As the national Electragists have created and put into effect and proved the economic necessity of a policy of distributing all electrical merchandise from manufacturer to jobber, to contractor-dealer, to consumers, we therefore enunciate the following fundamental merchandising plan to be used in any district in California, a plan which contemplates the sale of all current-consuming devices through the dealer. We choose to call it the "Through-the-Dealer Sales Plan."

We believe this plan to be a sound economic policy for the distribution of current-consuming devices to the consumer; a policy which will take up the gap apparently impossible to overcome in any other way, between the cost of selling, either by the central station or the Electragist dealer, and

the retail price obtained; a policy that will force-feed the sales of appliances and produce that "plus business" which is so essential to the successful operation of any business, be it the selling of electricity, the selling of automobiles, or the selling of current-consuming devices.

We mean by this "Through-the-Dealer Sales Plan" that all lamp-socket appliances and heavy duty appliances shall be sold through the dealer, preferably at manufacturers' list prices.

In the first place, let us consider the phase of this plan which contemplates the sale of lamp-socket appliances such as percolators, toaster, waffle irons, etc. It is necessary in any business to have campaign articles, and we know of no business where it is more important than in the electrical business, for we constantly are creating customers for our products, be it electricity or merchandise.

This plan contemplates, in brief, the purchase by the power company of campaign articles of reputable competitive make, and placing them in the dealer's place of business, on consignment, at a price that will allow the dealer a fair margin in selling to the consumer in his store. The power company's position is to advertise and promote these sales through demonstrations, displays, broadsides in monthly bills, and other mediums of sales promotion. The demonstration and creation of consumer demand for the appliances, which, years after they are sold will continue to bring revenue to the power company even after the loss or gain is forgotten by a dealer, are most important items to consider. Time payment or terms on all goods must be the same as good business judgment permits, but should be an item to entice the purchase of such goods. It would be a benefit to the entire industry if the financing of time payment contracts could be handled in conjunction with the power company policy. We must remember in the offering of time payments as an aid to volume of sales the timely word of caution by Roger Babson against too long extension of credit to pay, when he says: "The time payment method of paying for merchandise is the one economic factor that is gnawing at the vitals of American business today, and sooner or later, must come to some adjustment to insure continued prosperity for our nation's business."

It is expected, and is evident to all merchandisers, that when campaign articles are being advertised and sold, forty to fifty per cent, even more, of the volume of sales at least, will be of a nationally advertised line, which of course is carried in stock normally by dealers, and sold at nationally advertised prices.

In the case of overstock on articles sold at campaign prices, or obsolescence, special prices can be arranged and put on such merchandise through team work with power companies and dealers in various districts, making it possible for each dealer to sell the same thing at the same time, thereby keeping the stock of campaign appliances clean.

In the case of heavy duty appliances where campaigning is necessary, and it is necessary continuously, either on a price basis, demonstration, or advertising basis, the power company may buy them,

place them in the dealer's store on consignment, say, one to each enterprising dealer, with all sales to be made through the dealer. Of course the more progressive dealers can purchase a larger stock of ranges or appliances through the regular jobbing channel. This makes it easier to sell the consumers as a better variety of models will be available to choose from. It is not considered necessary for the central station to act as a handling agent, only as local conditions might dictate. Those eligible to participate under this plan are contractor-dealers or merchants who have maintained inside wiring departments capable of wiring and installing any of these appliances and later giving any proper service that may be necessary.

This plan contemplates the power company having salesmen out over their territory promoting the sale of these appliances as well as the dealer. It is evident that the service rendered to the consumer would be far above what might be rendered by the power company alone, or the dealer alone. There may be some skeptics who are in doubt about this point, but we want to state that we can give specific cases where dealers on a job, and the power company salesmen on the same job, working against each other, have so disgusted a customer in the presentation of their various cases that they have found other means of heating their hot water tanks, or using electricity for cooking. This is not something taken out of the clear sky, but is an actual fact that has been repeated in the experience of many in the industry. Many may argue that the sale of merchandise by the power company stimulates a dealer's business and gives competition, but we can say that a larger part of the competition we have found is of a destructive type, principally because of the commissions paid central station salesmen selling direct to consumers and price concessions far beyond what is profitable for a dealer.

We will not have team work as long as we have such destructive price competition, be it on merchandise or commissions, between an electrical store and a central station.

If the power company in a larger city wishes to maintain and operate an aggressive merchandising department, should it not be operated as a separate organization doing business on a strictly merchandising basis, buying and handling its own stock, doing its own financing, and handling its own accounts with customers, not placing customer account through power company consumer accounts?

There are many obvious advantages to this whole plan, though on first thought a number of objections may arise, but an honest and careful analysis, as we have given it, will prove its many advantages to the power company. It will be possible to sell better appliances, render a more complete and satisfactory service to a consumer, and encourage the use of electricity. It will keep in the hands of the power company, which no doubt is most interested, the control of consumer contact. The quality of merchandise sold to the consumer can largely be controlled; domestic and commercial equipment can more properly be displayed and promoted. We can

participate then, as all working on one side, instead of a dealer selling as a competitor to the central station, which never has worked out as an economic success. It will encourage continuous education, but all along one definite line, which is the most vital necessity in the electrical business today. It will not leave in the hands of the power company merchandising managers a large stock of merchandise that is becoming obsolete. An additional big advantage to the power companies is that they will not have term accounts as accounts receivable with customers which have to be collected by the usual high pressure methods necessary in collecting overdue accounts; no reserve for bad debts, no disgruntled customers. It will mean that the dealer will be encouraged with a return for his efforts, as against receiving no encouragement, with no return for his efforts. It will place good will, public contact, and the domestic load of the power company in synchronism with the progress of our industry and the complete, whole-hearted good will of dealers and workmen throughout its territory.

To the manufacturer it naturally means increased business in the way of appliances, transformers, generating equipment, and on down the line. To the jobber it means the same thing as to the manufacturer, and also, no doubt, a little quicker turnover than they have at the present time.

To the dealer it means an awakening to the profitable selling before him of electrical appliances, sold through that outlet that really can give a satisfactory service. It will mean added impetus to the promotion of the Red Seal Home, for a contractor-dealer can better see the return for his efforts in direct sales. They can continue in the business of giving service to the consumer, and by so doing will cement closer relations between themselves and the industry. Naturally, it will ferret out those who will work from those who won't. We believe it will lead to this ultimate result as an accomplishment, as James E. Davidson, past president of the N.E.L.A., says that "What the household wants from the power companies is not raw kilowatt-hours, but help in washing, ironing, refrigerating, cooking, heating, cooling, lighting and so on—human service that can only be rendered when appliances are installed."

This "Through-the-Dealer Sales Policy" is not new in many respects, but it is one which surely can answer the questions which were brought out in the early part of this discussion, and we therefore are offering it as a policy, the same as our other national policies; chiefly: the distribution of merchandise from manufacturer to jobber, to contractor-dealer, to consumer. No doubt there will be, and we invite extended discussion on this subject, for through such discussion, the merits or demerits of this policy will be quickly brought to our combined attention. We are sincere and believe that in this policy economically lies the success or failure of the Western part of our country to measure up in the increasing of domestic load, as it has measured up so far in the building of larger lines and greater generating plants.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Small Creek Developed for Power and Irrigation

By A. H. CROSSMAN, Assistant Engineer, Dis-  
tribution Department, The Southern Sierras  
Power Company, Riverside, Calif.

Full utilization of the small quantity of water in the San Gorgonio River (Riverside County, Calif.) is made possible through an interesting installation of two small hydro plants. An average of 9 acre-ft. of water per day is available for the two plants which utilize the water at heads of 1,770 and 900 ft. to produce 1,500 and 750 kw., respectively. From the tailrace of the lower plant the water is used for irrigation of the fruit groves north of Banning, Calif.

### General Features

For best efficiencies the plants must be run close to maximum capacity. This obviously means that storage and regulation of water must be effected.

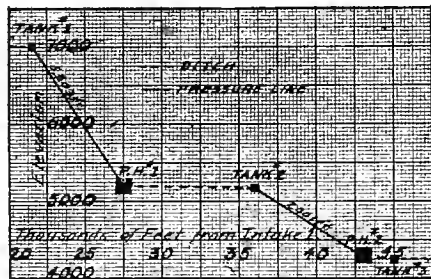


Fig. 1. Schematic chart showing relative positions of the two San Gorgonio plants.

Further, the users of the water for irrigation purposes desire a continuous flow.

These diverse demands are met by the use of three storage tanks. The uppermost of these has a capacity of about 2.85 acre-ft. and provides the storage necessary for the two plants. The second tank, located between the two plants serves only as a forebay and equalizer for Plant 2 and the third tank serves as a regulating basin for delivering a smooth flow to the irrigationists.

The watershed totals about 5.7 sq. miles and lies at elevations ranging from 7,050 to the summit of Mt. San Gorgonio at 11,485 ft. Intakes are ar-

ranged to collect all of the water available in the upper tributaries of the river and are connected to the reservoir tank by some 7,765 ft. of open ditch and 13,735 ft. of concrete-lined canal. The former is 20 in. wide and

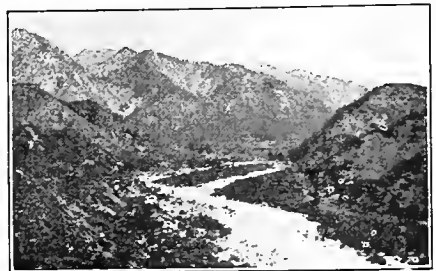


Fig. 3. Looking up San Gorgonio wash toward Plant 2, showing character of watershed in background.

the latter 30 in. wide and 21 in. deep. High-water elevation in the reservoir is 7,032, giving a total of 51 ft. drop in the 21,500 ft. of canals. Steel pipe grading from 18-in. No. 10 at the top to 16 x 9/16-in. at the bottom connects the reservoir with the nozzle at Plant 1. Plant 1 discharge is carried through 8,419 ft. of ditch to the tank serving as forebay for Plant 2 and which is connected to Plant 2 by an 18-in. steel pipe grading from No. 10 to 3/8-in. Plant 2 discharges into the third tank which serves as a source for the irrigation water.

Under normal conditions of rainfall and plant operation the stream flow is equal to 2/3 of the plant demands. This means that the plants normally are operated through two 8-hour shifts, allowing the third for the upper reservoir tank to refill. During abnormal or subnormal conditions the plants are operated in such a manner as to conserve the water available. Barring only flood conditions no water is spilled. Remote water-level indicating apparatus keeps the operator at Plant 1 constantly informed as to the water levels in the forebay tanks of the two plants.

### Plants

The upper plant contains a 2,330-hp. Pelton impulse wheel controlled by a Pelton type 0.3 governor. Directly connected is a Westinghouse 1,875-kva. synchronous generator and 35-kw. d.c. exciter. This plant normally is the controlling plant and therefore has the necessary equipment for the operation of Plant 1 and for receiving remote indications of operating and load conditions from Plant 2.

Plant 2 equipment is similar to that of Plant 1 except that the wheel is of 1,030-hp. rating, the generator a 938-kva. unit, and the exciter only 15 kw. Control equipment is arranged for normal operation from Plant 1, but may be switched over for manual control right at Plant 2 when occasion demands.

Control circuits operating at 220 volts connect the two plants so that the operator at Plant 1 may control the starting, stopping and operation of the generating unit at Plant 2. Normal operation control is through a sequence of relays which takes care of the various intermediate steps incident to normal starting or stopping of the unit. An emergency control is provided whereby the unit may be shut down quickly when some unusual or dangerous condition arises. Automatic protective devices at Plant 2 protect the unit from excessive variations in load, speed or temperature.

This arrangement of remote control together with the automatic protective features acts to reduce the operating costs of Plant 2 in particular and of the two plants as a unit of the system. Under normal conditions there are two operators stationed at Plant 1. The superintendent of the two plants is stationed at Plant 2. This arrangement enables the discharge of the necessary plant routine at Plant 2 in an economical manner. The superintendent usually attends to nothing but the usual meter readings, changing of recording-instrument charts and general inspection. Plant operation under this arrangement has been satisfactory.

These plants are owned by the San Gorgonio Power Company, but full output is sold to The Southern Sierras Power Company.

## 600-kw. Sub Destroyed by Fire Replaced in 22 Hours

By W. C. FOSTER, Assistant Operating En-  
gineer, Portland Electric Power Company,  
Portland.

An example of quick and ingenious restoration of service in a serious emergency was displayed by the Portland Electric Power Company when its substation at Beaverton, Ore., was destroyed completely by an early morning fire May 26, 1926. The substation building in question was of brick and wood and housed a 750-kva. bank of

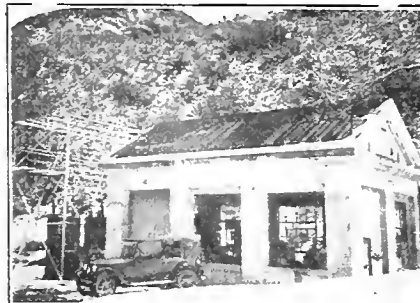


Fig. 2. San Gorgonio Plant No. 2.

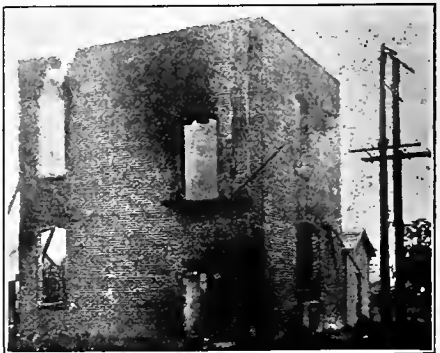


Fig. 1. Beaverton sub of Portland Electric Power Company, as it appeared the morning after the fire.



57/22-kv. transformers, together with oil switches, lightning arresters and all other usual equipment. The station served Beaverton at 2.2 kv. and also served Hillsboro, Ore., and many smaller towns and rural communities

22-kv. 3-phase distribution for the other towns and rural service could be supplied through a step-up bank from the low side of this transformer. There being no transformers of proper size and voltage to accomplish this

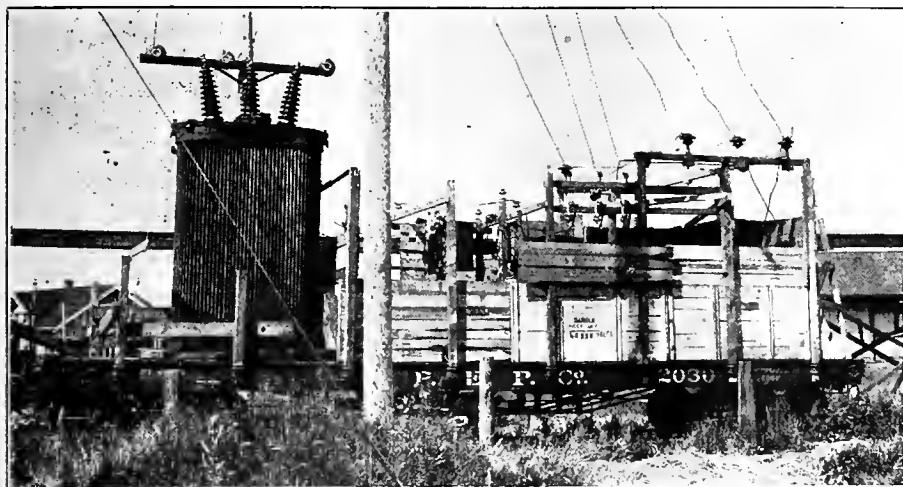


Fig. 2. Temporary Beaverton sub, assembled and placed in service within 22 hours after the fire started.

at 22 kv. Formerly it was the property of the North Coast Power Company, later acquired by the Puget Sound Power & Light Company, Seattle, and recently purchased by the present owner.

Immediately after the fire broke out, at about 2 a.m., company engineers began to lay plans to restore service. Inventories of idle equipment were canvassed and schemes for robbing equipment in service were considered. A 600-kva., 57/2.2-kv. 3-phase transformer was in use at Gresham delivering service which could be supplied from another direction. It was decided that this unit could be used for the 2.2-kv. Beaverton service, and that the

step-up, the engineers determined to use four 200-kw., 11/2.2-kv. transformers that happened to be in stock. The plan was to work these together in pairs by connecting the primaries of each pair in series to get the desired 22 kv. The secondaries then could be connected in open delta to the 2.2-kv. bus fed by the larger transformer and the necessary step-up accomplished. An examination of the records had disclosed that the capacity thus provided would carry the 22-kv. load normally supplied from this station.

These transformers with the necessary oil switches and two 2.2-kv., 200-amp. regulators were gathered together at the Hawthorne Building where the

company maintains some of its stores and shops and were mounted on a flat car commandeered from the railway department of the company. When this work was completed the car was rushed, by arrangement with the Southern Pacific Railway for "special train" right-of-way over all other traffic, to Beaverton where it was shunted onto a side track near the site of the demolished substation. In the meantime a line crew had been busy. The high line had been tapped and a 57-kv. 5-pole stub line built to the side track where the car was to stand.

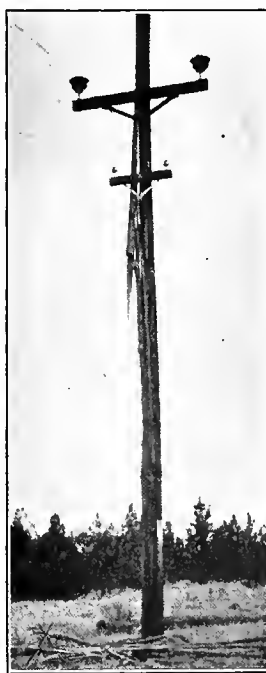
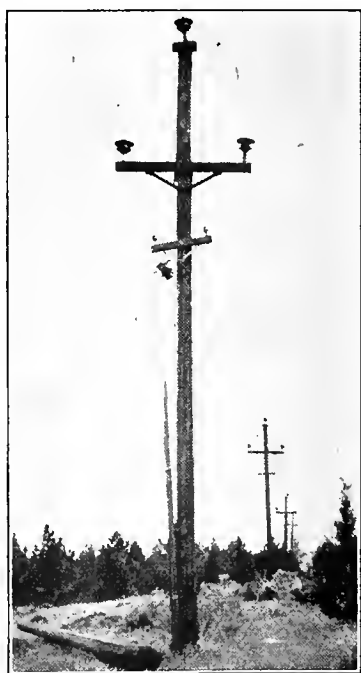
This work was carried on all during the day of the fire and extended well into the night; final taps and connections were completed about midnight. The switches were closed immediately energizing the entire distribution system for the service of hundreds of customers who had waited only 22 hours, believing that they would have to make the best of an outage of several days duration.

Plans already are under way for the permanent replacement of the destroyed substation. This is to be an automatic station with transformers outdoors and with regulating and re-closing equipment in a concrete building. It will have double the capacity of the old station, or 1,500 kw., in anticipation of growth in the territory for some years.

**Operating Figures on New Edison Plant.**—During the month of August, 1926, the No. 2 steam plant of the Southern California Edison Company generated 89,232,200 gross kw-hr., using 54,350 bbl. of oil and 802,414,000 cu.ft. of gas. The plant includes a 50,000-kw. turbine in service July 10, 1926, and two 35,000-kw. turbines in service about a year earlier. Average boiler efficiency was 81.54 per cent, average kw-hr. per bbl. of oil were 425.81, and average B.t.u. per net kw-hr. 14,677.

**New Oil Circuit Breaker Combines All Three Phases in Single Tank.**—Increased interrupting ability; rugged, oil-tight construction; increased electrical clearances; and minimum space requirements are claimed for the new Westinghouse breaker. The tank is cylindrical in form with belled top and bottom to effect economical use of materials and to present maximum resistance to internal pressure. A single operating lever protrudes from the rear of the tank; the rest of the levers are within the upper dome.

**Aluminum Paint Causes Transformer Troubles.**—According to the General Electric Company, a customer recently returned to the factory a transformer which had failed in service. The oil was dirty and carried a large amount of black sediment. Analysis proved the sediment to be aluminum. Further investigation developed the fact that the customer had sprayed the exterior of the transformer tanks and other adjacent equipment with aluminum paint. Inasmuch as the job was done in a closed building it seems that the atmosphere became more or less saturated with the paint spray resulting in the metallic aluminum being carried into the transformers through the breathers.



Nineteen poles were damaged, 11 to the extent of necessitating replacement, when lightning struck the 66-kv. transmission line of the California Oregon Power Company between the Copco plants and Kennett, May 22. No damage was sustained by electrical apparatus and the interruption to service over the line was only momentary, the line being returned to service immediately and kept in service until the repair gang was ready for the line.

# NEWS OF THE INDUSTRY

## Reasons Why California Water and Power Act Should Be Defeated

For the third time the so-called Water and Power Act in the form of a proposed constitutional amendment will appear on the ballot on Nov. 2 for acceptance or rejection by the California electorate. The same measure has been defeated decisively at two previous elections. Cogent reasons why it merits an even more overwhelming defeat at the forthcoming election are set forth in the following argument by Senator Arthur H. Breed, president pro tem. of the California Senate:

The pending Water and Power Act has been twice rejected by the people. Four years ago it was rejected by a majority of nearly 354,000 and two years ago by a majority of more than 431,000.

It is a constitutional amendment which pledges the state's credit to an issue of \$500,000,000 of tax-free state bonds. A board of five persons, appointed by the governor, would spend the money in acquiring, operating and maintaining such water and power projects as it deemed necessary or convenient. This political board would operate the projects from Sacramento, fix rates, and determine conditions and quality of service, all without regulation by the Railroad Commission. Consumers and communities would thus be at the mercy of five politicians with a virtually unrestrained control of industry. Should incorrect estimates, inadequate service or political mismanagement prevent projects from paying expenses or meeting interest charges or requirements for repayment of principal out of rates, explicit provision is made to meet deficits and losses out of the general funds of the state. The board is empowered to appoint such employees as it may require, and fix their compensation. These employees are exempted from the state civil service law, so that the board can build up a great political machine through patronage.

Advocates of the measure seek to take political advantage of California's occasional dry years and its constant concern about water problems by making the water and power amendment as a water conservation plan, but public ownership will not increase rainfall. What California needs in times of drought is more rain, not more empty reservoirs.

There is no public need for the state to embark in the power business, and no good reason for adding half a billion dollars of tax-free bonds to the huge volume of such securities outstanding. Some advocates of the water and power measure, undismayed by the failure of North Dakota in the wheat and banking businesses, and of many other government ownership projects, favor the act as a first step in California toward the taking over by government of essential industries and the redistribution of private wealth through taxation. There is no more reason why the state should adventure into the power business than into the flour or automobile business. Less than sixteen years ago the state undertook effective regulation of public utility companies. As a result, the rates, investments and service of such companies are now controlled by a public agency. To scrap the policy of regulation and substitute public ownership would be unjust and foolish. Even those who assert that regulation has failed cannot logically offer as an improvement a new commission appointed like the Railroad Commission by the governor and given the insufficiently restricted power of expending the taxpayers' money and hiring armies of employees.

Private initiative and effort developed California. Political management is usually wasteful and inefficient, and to compel taxpayers to provide enormous amounts of borrowed money for the financing of unspecified ventures by a political machine would be to invite disaster.

The voters should rebuke, by a majority larger than before, the restless agitators who refuse to accept the decision of the people twice so emphatically expressed. Such repeated submission of measures repeatedly rejected by the people should be prohibited.

### Experiment in Lifting Fish Uses New Device Successfully

A successful experiment in raising fish over dams, using the new Wheeler patent fish lift, recently has been completed at the Winchester Dam of the California-Oregon Power Company, on the Umpqua River in Oregon. The



Wheeler patent fish lift installed for experimental purposes at the Winchester dam of the California Oregon Power Company on the Umpqua River in Oregon.

Wheeler patent, the invention of J. R. Wheeler, construction man at Leedsport, Ore., for the West Coast Power Company, Portland, utilizes an iron cylinder placed upright in the river and extending from the river bottom to the top of the dam to be surmounted. The fish, swimming in the pools at the base of the dam, are trapped and induced to enter the cylinder through a gate near the bottom. At this period of the operation the level of the water in the cylinder is that of the stream below the dam. At suitable intervals this gate is closed and water is introduced into the cylinder from the top. Within the cylinder a screen, suspended horizontally from floats on the surface of the water, remains two or three feet below the surface and, rising with the water, keeps

the fish swimming near the surface. When the cylinder is full a gate near the top opens and discharges a volume of water containing the fish into a flume leading to the reservoir above the dam. Operation of the gates is automatic and can be timed to suit the conditions of the run of fish to be lifted.

The experiment was financed by several Northwest power companies and the Oregon State Fish Commission and completed with the personal assistance of Paul B. McKee, vice-president and general manager, California Oregon Power Company, Medford, Ore., J. E. Yates, assistant chief engineer, Pacific Power & Light Company, Portland, and the inventor. During a recent run of steelhead trout, observers saw fish delivered to the upper side of the dam and believed the device could be applied in practice.

### Tunnel of San Joaquin Company's Balch Plant Holed Through

The tunnel of the San Joaquin Light & Power Corporation's Balch plant on the Kings River, about forty-five miles from Fresno, Calif., was holed through Oct. 11. The final blast was fired by Miss Martha Wishon, daughter of A. E. Wishon, vice-president and general manager of the company, at the ceremony held in honor of the occasion. Work on the tunnel, which is about 19,350 ft. long and 12x12 ft. in cross-section, was begun Sept. 15, 1925.

The Balch plant, the first unit of a series of hydroelectric plants to be erected on the Kings River by the San Joaquin company, is to be operated under an ultimate static head of 2,470 ft., which will establish a new American record. The initial effective head will be 2,280 ft., the static 2,355 ft., and the initial generating capacity 28,250 kw. The planned ultimate capacity of the plant is six units, each of that size. Full details of the project were published in the *Journal of Electricity*, April 1, 1925, p. 241.

Construction work is in charge of H. K. Fox, who has been chief engineer of the project for several years.

### Electric Furnace Installations in Pacific Northwest

With the purchase of a 1-ton-per-hr. Electromelt furnace by the Puget Sound Iron & Steel Company of Tacoma two large electric furnace installations have been made in the Pacific Northwest during 1926.

The first was a 1,500-kw. installation of the same type in the foundry of the Northwest Steel Rolling Mills, Inc., of Seattle. The Tacoma installation has a capacity of 600 kw. and is served by the Tacoma Lighting Department. The furnace was sold by E. A. Wilcox, industrial heating engineer representing the Pittsburgh Electric Furnace Company.

## California Governor Calls Special Session to Ratify Six-State Compact

A special session of the California Legislature has been called by Governor Friend W. Richardson for Oct. 22 for the purpose of ratifying the six-state Colorado River compact.

In his call for the extra session, after pointing out that the six-state compact has been ratified unconditionally by the states of New Mexico, Nevada, Wyoming, Utah and Colorado, Governor Richardson continues in part:

"The six-state compact was drawn for the purpose of enabling the federal government to proceed without delay to erect structures in the Colorado River designed to protect Imperial and Palo Verde Valleys from the great danger of flood, to assure an adequate and a regulated supply of water for Imperial and other valleys, to provide additional water for Arizona lands, to provide additional domestic water for the cities of southern California and to develop hydroelectric power.

"Reservations and limitations written into the six-state compact by the California Legislature in 1925 proved unacceptable to the five other states, and, unfortunately, blocked all opportunity for action at the last session of Congress. . . . The short session of Congress will begin in the first week of December. There will be a general

rush to obtain favorable action on numerous proposals, among them the Colorado River program outlined by Secretaries Hoover and Work and embodied in the amended and rewritten Swing-Johnson bill.

"This measure contains a provision requiring unconditional ratification of a river compact by at least six states, including California, before any appropriation may be made or any work undertaken for Colorado River control and development. California must ratify the compact before Congress meets or no action can be expected. The cost of a special session is a small sum compared to what is at stake.

"There is a vital need for action that will lead without delay to protection of the lives and property of the men and women of Imperial Valley. The danger of flood, constant and increasing, must be eliminated if this productive region is not to be inundated and destroyed. The schemes of petty politicians who thrive on water agitation, should be swept aside and Colorado River development placed on a non-political basis.

"Nothing should be left undone by this state calculated to encourage prompt congressional approval of the great river project."

that the electric load in August, 1926, was 10 per cent greater than for the same month a year ago. The most important reason assigned was a revival in the metal mining districts of the state. Mr. Board stated that normal material purchases of the company run about \$3,500,000 a year and that the total operating and construction payrolls aggregate \$3,350,000 annually. About 40 per cent of the construction outlay is for labor.

### Utility Reduces Par Value of Stock from \$100 to \$25

At a special meeting of the stockholders of the Pacific Gas and Electric Company, San Francisco, held Oct. 11, the action of the board of directors in reducing the par value of the common and preferred stock of the company from \$100 to \$25 was approved officially.

The date of issuance of the new certificates has not been determined but it will be probably within the next thirty or sixty days, according to the official announcement. Notice as to when the plan will become effective will be sent to stockholders, and in the meantime the status of the old stock with regard to transfers, dividends, and in all other respects remains the same as before.

### Power Development in Snohomish County, Wash., Planned

A new hydroelectric power development in southeastern Snohomish County, Wash., at the foot of the Cascade Range, is forecast by three applications for water rights filed recently at the state hydraulics office by D. W. Stevens of Seattle. The applications seek permission to divert 30 sec.-ft. of water from the East Fork and 10 sec.ft. from the West Fork of Troublesome Creek and 5 sec.-ft. from the Sultan River. Two reservoirs are contemplated; one, to be known as Twin Lakes Reservoir, is planned for a storage capacity of 8,000 acre-ft., and the other, Blanca Lake Storage, for a 20,000-acre-ft. capacity.

Owing to the fact that a number of surveys are yet to be completed, estimates of the horsepower to be developed and of the cost of the project have not been announced.

### Colorado Utility Is Installing Steam Plant at MacGregor

The Colorado Public Utilities Corporation is making rapid strides in the erection of a structure to house its new steam generating plant at MacGregor, Colo. Progress also is being made in the construction of transmission lines from MacGregor toward Hayden, Craig and the oil wells of the Moffat fields. This corporation recently took over the electric light systems in Steamboat Springs, Oak Creek, Hayden and Craig, Colo. It is said that by fall the plant will be in operation to supply those towns and likewise the mines in Routt and Moffat Counties.

The first unit to be installed will have a capacity of 2,700 kw., and it is estimated that the original cost of buildings and electrical equipment at the central plant will exceed \$200,000. Ample provision is being made for additional units as development of the territory requires.



A group of officials of the Public Service Company of Colorado, Denver, in front of the company's new steam plant at Valmont, east of Boulder. From left to right they are—R. E. Berger, of the New York office of the Cities Service Company; C. A. Semrad, vice-president and general manager of the Public Service Company; F. S. Henderson, manager of the Western division at Boulder; G. W. Faller, vice-president; J. E. Elftman, chief engineer in charge of the Valmont plant; C. N. Stannard, vice-president and general manager; V. L. Board, general superintendent; and H. H. Kerr, superintendent of electrical department.

### Colorado Utility's Budget for Ten Years \$45,000,000

Expenditures totaling \$45,000,000 over a 10-year period are projected tentatively by the Public Service Company of Colorado in budgets announced at Denver.

The principal items scheduled are: Approximately \$3,000,000 a year to care for expansion of the Denver district in permanent additions to properties; expenditure of \$3,000,000 within the next three years for enlargement of the Valmont steam plant east of Boulder; expenditures of from \$5,000,000 to \$15,000,000 to supply Denver with natural gas if such supply is decided upon, or \$3,500,000 for improvements and additions to the arti-

ficial gas plant if the natural gas project is delayed.

Immediate expenditures proposed include \$1,500,000 for a new service and warehouse building at Denver; \$1,500,000 for enlargement of the Valmont plant and \$800,000 for completion of a new gas plant in Denver.

Two plans for bringing natural gas to Denver are under consideration. One, using the Fort Collins field in northern Colorado as the source of supply, is estimated at \$5,000,000. The other, which would utilize the natural flow of wells in the field in Amarillo, Texas, would cost \$15,000,000, it is estimated.

In announcing the budget, V. L. Board, general superintendent, stated

## Experimental Arch Dam on Stevenson Creek Holds When Filled to Full Height

The experimental arch dam built under the auspices of Engineering Foundation on Stevenson Creek in Fresno County, Calif., failed to break when filled to overflowing at its present height of 60 ft.

This experimental dam is 7½ ft. thick at the bottom and tapers to a

investment bankers, engineers, engineering schools and public utilities. It is hoped that additional funds may be secured so that the dam may be raised to 100 ft. in height.

H. W. Dennis, chief civil engineer of the Southern California Edison Company, was in full charge of the actual



Looking down stream at the experimental arch dam before the reservoir was filled. This picture gives some idea of how admirably Stevenson Creek Canyon lends itself to the experiment. Its precipitous side walls make it possible to build up a head of more than 100 ft. with the use of a remarkably small total volume of water. With the dam at its present height of 60 ft. the reservoir contains less than 5 acre-ft.

thickness of 2 ft. 30 ft. above the base. Above that level the 2-ft. thickness is constant. The dam measures 140 ft. along the crest, is 60 ft. high, and the arch has a radius of 100 ft. Preliminary work was begun in the fall of 1925. (Journal of Electricity, March 1, 1926, p. 197.) Excavations were made to make the base line of the dam as nearly a perfect V as was practicable in order to have a symmetrical cross-section which would permit of subsequent analysis with a minimum of complications. Pouring of concrete was completed June 4.

Thirteen load tests were made, the first on July 12, and continued intermittently until late in September. With a head of less than 50 ft. no leakage through the concrete of the dam or through any of the construction joints developed although there was a slight leakage around the ends of the dam. When the head was raised to 50 ft. a small patch of moisture, about twice the size of a man's hand, appeared at a construction joint about 15 ft. above the base of the dam. When the maximum head of 60 ft. was reached the moist area increased to approximately 7 ft. square. There was also some leakage around abutments. The dam contains no reinforcing steel, and no special provision was made in the concrete to make it waterproof.

Exceedingly accurate measurements were made of strain and deflection in testing, and the committee reports that it is highly pleased with the results which thus far have been obtained. It is expected that a full and complete report will be prepared as soon as practicable in which all results will be tabulated.

Approximately \$100,000 has been spent upon the dam to date. This money was contributed by public-spirited organizations throughout America, representing manufacturers,

construction work on the dam. W. A. Slater, chief of division of concrete and masonry structures of the United States Bureau of Standards, has had charge of the securing of the test data.

### Reception to A. G. Wishon Upon His Return from Europe

A. G. Wishon, president of the San Joaquin Light & Power Corporation, Fresno, Calif., was the guest of honor at a reception tendered him recently upon his return from a tour in Europe.

Inspired by the fact that Mr. and Mrs. Wishon spent three weeks in Bad Nauheim, Germany, where they took the curative waters, the party was made a Teutonic one, with a skit in German dialect, "Vot's a Vatt?" written by Al C. Joy, director of publicity for the company, and refreshments in the nature of a "Dutch lunch" of sandwiches, salad and beer.

Mr. Wishon gave an interesting account of his experiences and observations while abroad and outlined his tour, which included Germany, France, Switzerland and England, with return by way of New York and Missouri where relatives were visited. Dancing closed the evening's entertainment. About 300 employees and their families attended the reception.

### Los Angeles Public Library Opens Patents Room

A patents record room has been opened in the Los Angeles public library. Though incomplete, the room contains the largest patent collection west of the Mississippi River, according to George E. Chase, who is in charge of the patents, and includes United States, British, Canadian, Cuban and German records. As rapidly as the demand warrants and funds permit it is the intention of the library board to build up the collection still

further. During the first month 659 persons consulted the records, many of whom commented on the quiet, well lighted room and the value of the collection.

For the present the hours during which the patents room is open are: Mondays, Wednesdays and Thursdays, 10 a.m. to 5 p.m.; Tuesdays and Fridays, 2 p.m. to 9 p.m.; Saturdays, 9 a.m. to 1 p.m.

### Utah Company Permitted to Raise Rates and Revise Rules

Permission to revise its present rules, raise rates and revise tariffs has been granted the Big Springs Electric Company of Fountain Green, Utah, by the Public Utilities Commission of Utah. The order is to affect all patrons with the exception of the towns of Wales, Levan and Nephi, where the commission held the present rates are fair and reasonable.

Under the rates formerly in effect the company was receiving 7 cents per kw-hr. for lighting and general use, and one cent per kw-hr. for domestic power and fuel, with a minimum charge of \$1.33 per month. A discount of 10 per cent was allowed for prompt payment. Street lights have been furnished at the rate of 50 cents per month for 100-watt lamps and 50-watt lamps, with no discount.

The increase asked for provides a charge of 10 cents per kw-hr. for lighting and general use; 3 cents per kw-hr. for domestic power and heat; 90 cents per month for 100-watt street lights and 50 cents per month for 50-watt street lights. For general power an increase of 1 cent per kw-hr. is allowed.

### Seeks Extension of Permit for Klamath River Project

The Electro-Metals Company of San Francisco has applied for a year's extension of its preliminary permit covering a proposed development on the lower Klamath River. The company's present preliminary permit has run for two years. Work under it has been suspended since the passage of referendum measures in California making a state fish and game reservation on the Klamath below the mouth of the Shasta River. This law prohibits construction of any dam or other structure in the stream which will interfere with the migration of salmon. (Journal of Electricity, Nov. 15, 1924, p. 377.)

The applicant points out that the law has been under fire ever since its passage and that, as the Klamath is an important power stream, the restrictions may be modified in the future. Another possibility is that some development may take place which will make it possible to use the power resources of the stream without interfering with the run of salmon. As the company has had the project under consideration for eighteen years, it asks that its rights be extended as long as possible.

**Cuba Needs Wireless Beam Station.**—A treaty between Mexico and Cuba which provides for connecting the telegraph systems of the two countries by wireless has been signed and awaits ratification. Mexico has the necessary equipment, but Cuba will have to construct a new beam station.



## Idaho Power Company Celebrates its Tenth Anniversary

The Idaho Power Company, Boise, recently celebrated its tenth anniversary. Ten years ago there were five separate companies engaged in the generation and transmission of electrical energy in southern Idaho and eastern Oregon. The conflict between these companies, the keen competition, the duplication of facilities in one place as against the almost complete lack in another, resulted in generally unsatisfactory conditions with service almost non-existent.

On Aug. 1, 1916, the Idaho Power Company came into being and assumed control with the objective of its management "to effect a comprehensive organization, to weld the disassociated properties into a single working unit, to eliminate the unwieldy duplications, to effect broad efficiency and sensible economy—in a word, to bring the combined properties into a union whereby service could be spelled out properly and might earn its reward," according to The Elektrikat, the company's house organ.

The personnel of the company includes about seventy men who were with it at its beginning and have stayed with it continuously since that time.

## Utility Gives Group Insurance Policies to Employees

Ninety-eight of the employees of the Coast Valleys Gas & Electric Company, Salinas, Calif., at a special meeting held in that city Aug. 31 were presented with group insurance policies whose face value totaled \$107,750. Approximately twenty additional employees are to receive policies.

Length of service determined the amount of the policy. Employees who had been with the company from six months to one year received \$500 policies; those from one year to two years \$750 policies. For each year of service thereafter \$250 was added until the six-year period was reached when \$2,000 policies were received by all employees who had been in the company's service six years or more.

These group policies were written by the Equitable Life Assurance Society of the United States.

The policies were presented by J. F. Pollard, vice-president and general manager of the company. L. C. Jay of the San Joaquin Light & Power Corporation was one of the speakers on the evening's program.

## Circuit Breaker Engineering New Westinghouse Department

A new department under the direct management of J. B. MacNeill, electrical engineer, is to be created at the Westinghouse Electric & Manufacturing Company, according to an announcement made recently by W. S. Rugg, vice-president.

The new department, to be known as the circuit breaker engineering department, is a direct outgrowth of the large increase in production during the past year of air and oil circuit breakers, air-break switches and high-voltage fuses. It is stated by Mr. Rugg that sales of this apparatus ran well over \$12,000,000 last year.

The new department, under Mr. MacNeill's direction, will be concerned

chiefly with new designs of circuit breakers and the development of new types.

## Commercial Department Changes Made by Edison Company

The following changes have been announced by the Southern California Edison Company: R. R. Walbridge, who has been district manager at Porterville, has been transferred to the same position in the Santa Barbara district. R. H. Sterling, who has been district manager in Santa Barbara, has been placed in charge of the Santa Barbara district investment department for the company.

A. W. Frost, assistant district manager of Alhambra, has been made district manager of Porterville, succeeding Mr. Walbridge. D. F. Iverson chief clerk at Redondo, has been transferred to Alhambra in the same capacity. J. L. Kline, power and sales bookkeeper at Fullerton, has been appointed chief clerk for the Redlands district of the company. I. K. Smith, chief clerk at Redlands succeeds Mr. Iverson at Redondo.

## Amplification Apparatus Test Gives New Use for Plane

A new and important field of usefulness for the airplane would seem to have been opened up through the demonstration recently staged by the Plane Speaker Corporation of Philadelphia at the National Air Races at Model Farms Field, Philadelphia. From a large airplane music and spoken messages were transmitted and projected toward the earth at altitudes ranging from 1,000 ft. to a mile, and were heard clearly by spectators on the ground without the use of any radio receiving set or other outside means.

The apparatus employed is known technically as a Western Electric No. 1 public address system. As installed in a Sikorsky, twin-motored plane the equipment weighed approximately half a ton. This entire amplifying apparatus, consisting of a microphone, amplifier panels with the necessary batteries and power supply apparatus, control switches and special loud speaking projectors, was mounted entirely within the body of the plane. No part of the equipment was visible from the outside. The three special loud-speaking projectors were mounted vertically, one in back of the other, and with the bell end pointing earthward. Forward of the projectors and in a position directly between the wings were mounted, pendulum fashion, the amplifier panels and power apparatus. The amplifier panel was suspended by means of shock cords and tension springs in order to prevent injury to the equipment during take-off and landing operations. A close-talking microphone constituted the medium by which messages and music were directed into the amplifying equipment.

Engineers of the Bell Laboratories and Graybar Electric Company, who designed and installed the amplifying apparatus, predict that with voice amplification apparatus installed the airplane of the future will become most useful and valuable in making observations, gathering important data and communicating it to large masses of people over wide areas of the country.

## Report of Railroad Commission Shows Utilities' Growth

An index as to the development of public utilities in California during the period from March 23, 1912, the effective date of the Public Utilities Act, giving the railroad commission jurisdiction to pass upon public utility security issues, until June 30, 1926, is furnished by the fact that during that period the commission has passed upon \$2,380,200,921.74 of such securities.

The total amount of securities passed upon during the fiscal year from July 1, 1925, to June 30, 1926, was \$271,024,507.26, of which \$262,463,149.26 of stocks, bonds, notes and other evidences of indebtedness were authorized. The commission denied permission to issue \$274,960 and dismissed applications for \$8,286,398 of such securities.

The record for the entire period of the commission's jurisdiction shows that the commission has not exercised a "rubber stamp" jurisdiction. The record is as follows:

Granted .....	\$2,185,407,909.92
Denied .....	101,838,580.04
Dismissed .....	92,954,431.78
Total.....	\$2,380,200,921.74

The annual report of the commission's department of finance and accounts contains some interesting figures on utility operation during the calendar year 1925. The following comparison between operating revenues and expenses of electric companies for the years 1924 and 1925 is given:

	1924	1925
Operating revenues.....	\$83,204,072.90	\$90,706,599.06
Operating expenses.....	45,197,687.96	40,807,061.51
Net operating revenue.....	\$38,006,384.94	\$49,899,537.55

The number of informal complaints has dropped from a peak of 6,315 in 1923-24 to 3,453 in 1925-26, due, it is claimed, to the installation of uniform rules and regulations by the commission.

## East Bay Utility District Files Condemnation Suits

Condemnation suits have been filed in the superior court of Jackson, Amador County, Calif., by the East Bay Municipal Utility District, Oakland, Calif., for land included on its Lancha Plana dam and reservoir site on the Mokelumne River in Amador and Calaveras Counties, according to press report. The complaint states that the land owned by the defendants, among which are the Pacific Gas and Electric Company, Stephen Kieffer, Western Pipe & Steel Company and a long list of banks and trust companies, is required by the district for its municipal water supply and power project and the court is asked to set a value on the properties for sale to the district.

The suit filed recently by the Delta Farms Reclamation Districts and California Delta Farms, Inc., against the East Bay Municipal Water District and against officials of the state division of water rights and the department of public works has been ordered dismissed. (Journal of Electricity, Aug. 1, 1926, p. 106.) The complaint protested against the granting of the permit to the district and asked that the evidence be reviewed and the permit denied.

## News Briefs

**Extension of Electric System in Melbourne.**—Work estimated to cost \$1,312,000 is now being carried out by the Victorian State Electricity Commission to supply additional electric energy to the eastern suburbs of Melbourne, Australia. It will have the effect of bringing 500,000 more people within the area directly supplied by the commission. The construction of the main line from Yarraville to South Melbourne is well advanced. The commission, stating that electric labor-saving domestic appliances are not being used in Melbourne to the extent justified by the low cost of operation, is advertising them, according to U. S. Commerce Reports.

**Puget Sound Power & Light Company Construction.**—The Puget Sound Power & Light Company, Seattle, will construct a power substation of fireproof construction, to cost \$12,000, at 54 Massachusetts Street. The building will be one story high, 82 x 46 ft. in size. The company also will start work immediately on the first \$25,000 unit in an aggregate expansion plan of \$150,000 for the company in Bremerton, Wash. First work will be construction of an office building and operating plant, with sales rooms on Fourth Street.

**Combined Net Earnings of Standard Gas Utility Properties Increase 14.69 Per Cent.**—Combined net earnings of all operated utility properties of Standard Gas & Electric Company for the twelve months ended June 30, 1926, showed an increase of \$7,797,710, or 14.69 per cent, as compared with the previous twelve months. Gross earnings increased \$10,621,352, or 7.95 per cent.

**Million-Dollar Power Project Contemplated for North Fork of American River in California.**—Application has been filed with the California Division of Water Rights by the American River Water & Power Company, with headquarters in San Francisco for a permit to divert 200 sec.-ft. from the North Fork of the American River and to store 50,000 acre-ft. This application is interpreted by officials of the water division as intended to supersede previous filings made through Fred P. Tuttle, Jr., of Auburn, Placer County, Calif., about two years ago and on which no action has been taken. Mr. Tuttle, one of the organizers of the company, recently disposed of his interests to Fred Dewhirst, who is an applicant in the new filing. Plans contemplate the construction of a \$1,000,000 power project in French Meadows, Placer County, including a reservoir near the town of Donner and a dam 30 ft. high.

**Permit Granted for Appropriation of Water from North Fork of Yuba River.**—The Pacific Gas and Electric Company, San Francisco, has been granted a permit by the California Division of Water Rights to appropriate for storage purposes 15,000 acre-ft. per annum from the North Fork of the Yuba River. Plans contemplate the development of 7,955 theoretical horsepower.

**Pacific Gas and Electric Company Dams Creek to Increase Water Supply for Two Power Plants.**—Philbrook Creek, a tributary of the West Fork of the Feather River in California, now is being dammed by the Pacific Gas and Electric Company to increase the water supply of its Centerville and DeSabra power plants. Plans call for an 85-ft. dam with a crest of 850 ft. to create a reservoir of 5,060 acre-ft. capacity. The cost of the project, which is expected to be completed before the end of the year, is estimated at \$250,000.

## P.C.E.A. News

### Commercial Section Plans Work for Year 1926-7

The first general conclave of the Commercial Section of the Pacific Coast Electrical Association will be held in Santa Cruz, Calif., Nov. 12-13, 1926, as the result of action taken by the Section executive committee at a meeting in Fresno Sept. 28. At the same meeting plans for the work of the section for the year 1926-7 were laid out.

Following the plan of organization laid down by the Commercial National Section, the work of the Section has been divided into four classifications, namely, general, lighting, power and heating and merchandising. Various committees have been organized under each of these classifications with a general chairman heading each of the four groups of activities.

Glenn D. Smith, Ontario Power Company, Ontario, Calif., will head the general group of committees which will include a committee charged with devising a program of organization and operation which will bring continuity and permanency into work of the section. The work of the customer relations committee, which this year will publish a series of messages to employees and conduct an essay contest similar to that of last year, also will be under the direction of Mr. Smith.

The committees engaged in lighting work will be under the general direction of Clark Baker, National Lamp Works. The industrial lighting committee will continue the series of lighting lectures started last year. Requests have been received from twenty-five organizations for this lecture. The street and highway lighting committee will make a special study of highway lighting, in addition to keeping the annual proceedings of the organization up to date on street lighting developments. The commercial lighting committee will make a study of electrical advertising with special reference to electric signs.

W. C. McWhinney, Southern California Edison Company, Los Angeles, will supervise the work of the group of committees charged with studying power and heating. The agricultural power committee under the chairmanship of A. M. Frost, San Joaquin Light & Power Corporation, Fresno, will correlate existing information with reference to the steady dropping of the water table in various sections of the

state with the idea of preparing information to combat the sales resistance to electric pumping which is anticipated. This committee also will make a study of electricity in the dairy industry with special reference to sterilization and refrigeration.

The industrial heating committee will continue the compilation of data for the industrial heating sales manual issued last year. The commercial cooking committee is to compile data and report upon the operation of some of the existing commercial cooking installations in the state. The competitive power committee is to collect data relative to small Diesel engine competition and abstract from the reports of the N.E.L.A. committee such information as is specifically applicable to the territory comprising the P.C.E.A.

Committees studying merchandising and allied subjects will be under the general supervision of J. W. Wrenn, Great Western Power Company, San Francisco. The electric range committee is to make a special study of range service practices and costs. The air heating committee will issue a new edition of the air heating sales manual brought out two years ago. The refrigeration committee is to compile a resume of sales policies now followed by manufacturers and central stations in this territory and also to report upon servicing practices and costs. The general merchandising committee is to investigate the low domestic kilowatt-hour consumption now existing in California and to make recommendations for its increase.

The national water heating committee, which is under the leadership of H. K. Griffin, chairman of the Commercial Section of the P.C.E.A., is to report upon a plan of procedure and to outline the water heater tests which are to be conducted in this territory.

Plans for the first commercial conclave of the section at the Casa del Rey Hotel at Santa Cruz call for an innovation in the form of a general meeting which will be addressed by outstanding commercial men from outside the territory of this association as well as by leaders in the commercial activities of the member companies of the P.C.E.A.

### Engineering Section Committee Vice-Chairmen Appointed

In pursuance of the policy of enabling continuous committee work, vice-chairmen of all of the committees of the Engineering Section, P.C.E.A., were appointed at the Los Angeles meeting of the Engineering Section Sept. 1-3. Confirmation of these appointments as subsequently announced by J. G. Rollow, chairman of the Engineering Section, is as follows:

Accident prevention—S. M. Bullis, California Oregon Power Company, Medford, Oregon.

Electrical apparatus—R. H. Halpenny, The Southern Sierras Power Company, Riverside, California.

Hydraulic power—E. A. Crellin, Pacific Gas and Electric Company, San Francisco.

Inductive co-ordination—J. O. Binney, Southern California Edison Company, Los Angeles.

Meter—W. N. Lindblad, Pacific Gas and Electric Co., San Francisco.

Overhead systems—H. H. Minor, San Joaquin Light & Power Corporation, Fresno, Calif.

Prime movers—F. G. Philo, Southern California Edison Company, Long Beach steam plant.

Safety rules—W. E. Row, Southern California Edison Company, Los Angeles.

Underground systems—H. H. Buell, Pacific Gas and Electric Company, San Jose, Calif.

# Northwest Electric Light & Power Association

## Administration of Sections of Northwest Association in Capable Hands

With the question of personnel settled, work is getting well under way in the Northwest Electric Light and Power Association. The sections are in capable hands, and a busy, worthwhile year is forecast.



GEORGE C. SAWYER

George C. Sawyer, sales manager, the Pacific Power & Light Company, Portland, is chairman of the Commercial Section. Mr. Sawyer has been connected with that company more than 16 years, having entered its employ in June, 1910, as meter engineer with headquarters in Walla Walla. Three years later he was made district manager at Yakima, a position he held for eleven years prior to his appointment

to the sales managership of the company. Mr. Sawyer's experience outside of the Pacific Power & Light Company includes three years in the elec-

tric meter department of the General Electric Company at Lynn, Mass., and three years in the meter and commercial departments of the Consolidated Lighting Company, Montpelier, Vt.

Leadership of the Public Relations Section is in the capable hands of R. M. Boykin, manager of the central district of the Puget Sound Power & Light Company, Seattle. Mr. Boykin, a prominent figure in the affairs of the electrical industry in the Northwest, served as president of the association during 1924-1925. His experience in matters electrical covers a broad field, including motor installation in southern cotton mills, work on power distribution systems in Nevada mines, and operation of an electrical system in Oregon. He was vice-president and general manager of the North Coast Power Company, and when that company was absorbed by the Puget Sound company



LEWIS A. McARTHUR

Mr. Boykin was made manager of its southern district, remaining there until his promotion two years ago to his present position.

The chairmanship of the Technical Engineering Section is held by F. J. Rankin, chief engineer, Idaho Power Company, Boise, a position he has held since 1921. Prior to his connection with that company he had spent four years as chief engineer for the Public Utilities Commission of Colorado and one year in private practice. He has been active in the National Electric Light Association and was one of the engineer members of its range survey committee which conducted tests on ranges in Boise and Spokane.

Accounting Section affairs this year will be under the guidance of W. L. Fitzpatrick, general auditor of The

Mountain States Power Company, Tacoma. Mr. Fitzpatrick, who has jurisdiction over the accounting departments of all divisions of that company, was connected with its subsidiary, the Tacoma Gas & Fuel Company, Tacoma, and allied companies for about 14 years. Prior to his present position he was treasurer and auditor of the Tacoma company, the Puget Sound Gas Company, Everett, Wash., and the Olympia Gas Company.



W. L. FITZPATRICK

Lewis A. McArthur, vice-president and general manager, the Pacific Power & Light Company, Portland, is chairman of the rural electric service committee. Connected with that utility since 1910, Mr. McArthur has held successively the positions of chief clerk, purchasing agent, chief clerk to the president, assistant general manager and general manager. He is an authority on geographic matters and on



R. M. BOYKIN



F. J. RANKIN

Oregon history and holds an honorary degree of Master of Science and Public Service from the University of Oregon.



# News of the Electragsists



## Daring, Frankness Distinguish Convention of California Electragsists at Del Monte

No gentle-spoken, self-satisfied effusion of self-congratulations over past achievements characterized the first annual state convention of the California Electragsists, held at Del Monte, Oct. 1 and 2, 1926. Quite to the contrary, indeed, was this meeting of electrical contractors and dealers, both in its closed sessions for members alone and in its even more outspoken open meetings to which representatives of jobbers, manufacturers and power companies were invited.

Almost without exception the speakers who addressed the meetings squared themselves fearlessly toward the particular problem under discussion and let go verbal "lefts" and "rights" which made their effect felt. It is not often such frankness is exhibited in a convention. The novelty of this very situation contributed in no small way toward making the convention one of the most significant and important in electrical history in the West in many years.

The only regret of those in charge of arrangements was that every contractor in California could not have been present to hear some of these talks, particularly that of Joseph A. Fowler, president of the Association of Electragsists, International, the honor guest at the convention and its most distinguished speaker. His address, given at the close of the convention, Saturday afternoon, as a culmination of many similarly frank discussions in previous meetings, welded the various problems of the Electragsists into a solid front and left no doubt as to the contractor-dealer's place in the sun.

### President Fowler Carries Through

Characterizing the electrical contractor as one of the anchor posts of a



East and West. Joe Fowler, president A.E.I. and Harry Walker, retiring president California Electragsists and now vice-president and southern division chairman.

four-cornered industry, Mr. Fowler went on to say that the contractor in the past has been satisfied to live to himself and has neglected industry re-

lationships. He recounted the difficulty he had experienced when first named president of the Association of Electragsists in getting an audience with the jobbers' organizations. Since that audience has been gained, he said, he has had no difficulty in convincing them that their position in the industry has been undermined by recent tendencies to holding company ownership and consolidation of central stations and of manufacturing industries. The jobbers' future, he contended, would



CLYDE CHAMBLIN  
Newly elected president of the California Electragsists.

depend upon continued relations with contractors and dealers. The contractor on the other hand, he pointed out, must make it possible and profitable for the jobber to do business through the contractor-dealer.

The recently formed National Electrical Manufacturers' Association, bringing together the four similar and parallel associations of the past, Mr. Fowler said, was a great step forward, and would enable the Electragsists to deal with one organization to promote and continue the relationship between Electragsists and manufacturers in the future.

Mr. Fowler complimented the central stations of the West for their broad-gauge policies and their fine co-operation with electrical contractors. "You have no axes to grind with the power companies out here," he told his audience. He emphatically urged the Electragsist to take an active part in politics because he could do so and should do so as a citizen, so that the present status of central stations in California might be maintained in the face of such agitation as that of a water and power act.

As satisfactory a situation with respect to power company co-operation does not exist elsewhere, however, Mr. Fowler claimed. He referred speci-

fically to the misunderstanding between the wiring committee of the N.E.L.A. and the Electragsists which has finally resulted in the calling of an industry conference on wiring in New York, on Oct. 15. At this conference, presided over and refereed by Earl E. Whitehorne, commercial editor of Electrical World, representatives of the four major branches of the industry, the central stations represented by the wiring committee of the N.E.L.A.; the manufacturers, the jobbers, and the contractors represented by the Association of Electragsists international, will meet to discuss wiring problems.

Mr. Fowler explained in dramatic detail all the stages of the controversy arising over the proposal to use non-metallic sheathed cable, in which the Electragsists were accused by the N.E.L.A. of holding up the wiring of homes for their selfish ends. In order to place the contest on an equal footing, he told with humor, "We asked a most insulting question, a most insulting question. We asked if it were true that electrical development had been retarded, wasn't it possible that the cost of electricity had something to do with it? Wow!" Yet he pointed to the hopeful signs of future understanding that should arise out of a willingness of the other branches of the industry to recognize that each had a right to existence.

Speaking of contractor organization, he declared that the failures of the past in contractor-dealer groups had been failures due to indifference of contractors to each other, a lack of fellowship and of willingness to play the game together. In recounting what the International had accomplished to elevate the contractor-dealer Mr. Fowler pointed out the simple and effective accounting system the Electragsist organization had evolved and adopted. He said that the Electragsists have taught contractors to estimate correctly the cost of their jobs and



Eddie Martin will continue to record doings as secretary for another year. Art Dahl, however, only records golf scores and runs tournaments and things.

eliminated the biggest gambling element in electrical contracting, the guessing as to the cost of labor.

Mr. Fowler warned contractors that



their organizations were not to fix and hold up prices, that such practices, being contrary to all economic laws, always brought disaster.

What of the Future?

In recent attempted code requirement changes to allow unprotected use of non-metallic sheathed cable the code has shown itself to be but a minimum standard, subject to attack and to a certain extent vulnerable and has brought to the Electragists the realization that a higher standard is needed, Mr. Fowler said. Non-metallic sheathed cable, he said, was felt to be a backward step. What is needed is a standard of wiring even better than that prescribed by the code, so that the Electragists will have something of high quality to sell. A new standard of wiring to be known as the Electragist standard is being worked out, claiming for itself not only adequate wiring according to the code but wiring that will do the work required of it and with ample reserve.

He went on to point out the need for local organization as well as national organization, to accomplish right at home the things necessary to good business. He declared that the Electragists cannot do the Red Seal program justice until they are ready. They will not be ready, he said, until they learn first to help themselves. He urged Electragists to finance their organizations wholly themselves, get local managers, and get soundly organized.

A plan to finance, so simple that it is a wonder it had not been thought of before, was suggested by Mr. Fowler as a logical and easy means of getting funds to run Electragist organization. The plan is that three cents or more per hour be added to the hour cost of each job figured, to be paid to the association weekly at the time pay checks are being made out. The cost of association work is thus put on actual work done and is paid for by the public, which receives its benefits from the association through better efficiency and workmanship.

In closing his stirring address Mr. Fowler admonished the Electragists not to seek membership for mere numbers but emphasized that unless new members taken in are convinced of the value of belonging and are willing to abide by and live up to the principles set forth in the Electragist

code of ethics it were better they never become members.

When Mr. Fowler concluded his speech, giving his assurance that the Electragists sought no quarrel with the industry, in spite of the fact that it was necessary to make someone mad once in a while to get attention to what they had to say, and illustrating his point with a story of a negro stevedore from his home town of Memphis, Tenn., who went to war, demanded war, and found the Germans "sure are obli-gatin'," he was greeted by a demonstration seldom accorded any speaker. His speech was declared on all sides to have been a most fitting climax to an extraordinary convention.

Merchandising Paper First Day's Bombshell

Preceding Mr. Fowler's speech, and building up to it as though prearranged, was a program which in frankness and daring set a precedent for California electrical conventions. In attendance the convention, though not as large as some previous divisional conventions, was representative of the leaders in Electragist affairs from both the northern and southern divisions who will carry the convention's thought back to their divisions in future meetings. More than a hundred contractors and their families from both sections of the state attended, besides the well represented jobber, central station and manufacturing groups.

Delayed by the arrival of the special train carrying the Los Angeles delegation, the convention nevertheless quickly got under way, Friday morning, under the chairmanship of President H. H. Walker. In his opening remarks Mr. Walker declared that the work of the Electragists was truly just starting, despite work done in previous divisional meetings and that previous contractor organizations had existed before affiliation with the Electragists. He spoke of the two functions of the Electragist organization; first, that of establishing contact with others in the industry, and second, the education of its own members to higher standards.

In reviewing the first of these functions Mr. Walker pointed out that central station and jobber relations were good; that working with electrical inspectors was continuing on an accustomed co-operative plane, and that the

relationship of the California Electragists with the California Electrical Bureau, representing the industry as a whole, was most cordial and that in fact the Electragists had been designated by the latter to further the Red Seal plan in California.

In its internal program the California Electragists have established estimating classes, set up accounting systems, and contributed a great deal to a better merchandising set-up.

Felix Butte, vice-president of the California Electragists and chairman of the northern division, next addressed the general meeting. He commented that this convention was the first joint convention of northern and southern contractor groups since 1913 and that it would not be the last. A welcome to the ladies and an invitation to them to attend the meetings concluded Mr. Butte's remarks.

Following these preliminaries the discussion plunged headlong into that most pressing of contractor-dealer problems, merchandising of electrical appliances. O. N. Robertson, Santa Ana, Calif., Electragist, chairman of the southern division's merchandising section, read a paper prepared for the state merchandising section by himself and H. H. Courtright, manager of the Valley Electrical Supply Company, Fresno, and exploded a bombshell which set the pattern for the entire convention. Mr. Robertson's paper is reprinted in full beginning on page 303 of this issue of the Journal of Electricity.

The effect of this merchandising section report, with its declaration for the establishment of a definite trade policy contained in the resolution at its conclusion, was somewhat startling. It set forth that "through the dealer" is the most economical and logical means for the distribution of appliances to the public.

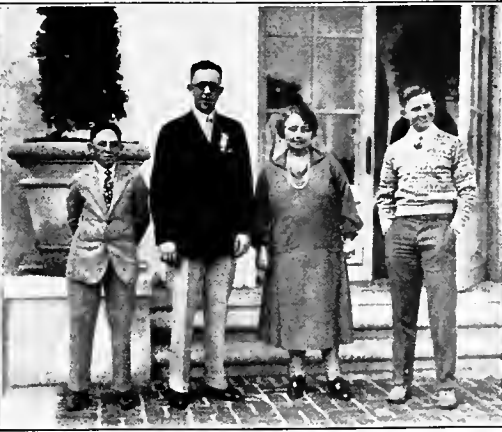
The resolution proposed by the merchandising section, setting forth these principles as a trade policy, was subsequently adopted by the California Electragists in a closed meeting.

Estimating and Motor Sections Report

R. L. Booth, chairman of the southern division's estimating section, reported for the state estimating section, relating the work undertaken by the section in meeting with architects, improving electrical lay-outs in plans, and improving and modernizing speci-



Male quartette or what have you? Hob Barnes, Cy Geisbush, W. L. Hyde and C. A. Rowley watching the golfers go forth, or fifth.



Himself, not a moving picture! Vic Lemoge, in one of these touching society family scenes with Mrs. Vic and the two boys.



Framed in the doorway and body-guarded by Mrs. Frank McGinley and her husband, Paul, is Mrs. Needham, of Beverly Hills.

fications. "The cost data committee," he said, "was comparing typical jobs to check up on costs, looking toward more uniform estimating to care for all items." The estimator's greatest problem, that of figuring labor units, is engaging special attention, according to Mr. Booth.

"A modified form of the national Electragist system of estimating was under consideration for adoption for the southern division," he said. At the conclusion of Mr. Booth's report President Walker commented on the commendable fact that these estimating meetings were breaking down the suspicion and secrecy which had formerly prevailed between estimators and showing that a mutual understanding of each other's problems was of more value than selfish secrecy.

Norman Nelson, Enterprise Electric Works, San Francisco, reporting for the state motor section, read a paper on motor trade conditions from the May Electragist, official magazine of the A.E.I. Trade conditions in motor selling were declared to be harassed by manufacturer and jobber by-passing of the dealer under unfair conditions, wherein the jobber attempted to sell to his customer's customers, quoting prices which the contractor could not meet if he had to buy from the jobber and discrediting the contractor in the eyes of his customers as a profiteer.

A resolution, pledging support to the national committee now engaged in conference with motor manufacturers to remedy this condition, was later presented in closed meeting and passed unanimously, following discussion as to whether or not local action would get results.

#### Special Work in Northern Division

Reporting on special activities in the northern division, George Eldridge, field representative for the division, summarized the Red Seal activity in the division. He spoke of the recent organization of electrical contractors in Sacramento on a sound basis, permitting them an appropriation of \$150 for advertising in newspapers. Out of 34 contractors, 32 belong to the association.

Mr. Eldridge said that working with the California Association of Electrical Inspectors, several small cities had been approached successfully with respect to establishment of simple electrical inspection. County inspection, also was being worked for, with considerable chance of success in several counties.

#### Tribute to San Rafael Contractor

Charles T. Hutchinson, vice-president and general manager, McGraw-Hill Company of California, and chairman of the California Electrical Bureau, closed the first morning's session with a review of the Red Seal activities in California under the arrangement between the bureau and the Electragists. He outlined the place of the bureau with respect to the industry and told of the bureau's promotion plans for the Red Seal plan for home wiring, indicating that every angle of this promotion was being cared for and that continued support of the Electragist was necessary.

As an example of what might be done in Red Seal selling by the contractor, Mr. Hutchinson cited the record of H. R. Eklund, Electragist of

San Rafael, Calif. Mr. Eklund, in the face of stiff competition, bids for electrical wiring jobs on a competitive basis, and after getting them, proceeds to sell the owner the Red Seal idea, with the result that out of sixteen such jobs he was able to convert twelve to Red Seal specifications. One job, for which the original wiring figure was \$140, he was able to build up to \$2,200, including the sale of wiring, range, water heater, air heaters and an electrical refrigerator. "It is more of this type of selling that the industry needs," Mr. Hutchinson declared.

Clark Baker, National Lamp Works, talked at one of the closed sessions on the importance of illumination to the Electragist. He put forth one particular thought which merits expansion, namely that the contractor group is the single group in the industry which is without a trained sales force, and that the other branches of the industry might well support it in selling.

#### Tells of Cedar Point Convention

C. J. (Cy) Geisbush, executive secretary, southern division, in one of the closed sessions of the convention, reported on the convention of the Association of Electragists, International, held at Cedar Point, Ohio, to which he went as the California delegate.



Estimator and Red Seal genius, R. L. Booth, chairman estimating section, southern division, and H. R. Eklund, San Rafael's champion Red Seal contractor salesman.

Speaking of the many worthwhile meetings, the talks by leaders in electrical contracting fields throughout the country, and the work accomplished at the convention, Mr. Geisbush led up to a reading of the report of the trade policy committee of the A.E.I., presented at Cedar Point by W. Creighton Peet.

Hobert W. Barnes, assistant secretary of the southern division, reporting on that division's activities, presented a clear and straightforward plea for better personal and business relationships, for greater interest in the activities of the association, and for a consciousness of the obligations demanded in observing the code of ethics of the association. If the organization were a wealthy organization, he pointed out, its work could be paid for and done with less effort on the part of individual members, even if at a loss to themselves in personal interest. But with small working funds the success of the Electragist organization rests upon the individual members' active participation in its activities and in living up to its requirements. Mr. Barnes' talk was so sincerely and lucidly given that many regretted it had not been programmed for one of the general sessions.

The second general session, Saturday afternoon, opened with an announce-

ment of the selection of Clyde L. Chamblin, California Electrical Construction Company of San Francisco, and prominent in Electragist and electrical circles for many years, as president of the state association for the year. In accepting the position Mr. Chamblin referred to the fact that he had been president of the state association some years ago, and that he again accepted the position with a feeling of its responsibility. For the big job, he said, he knew the present organization provided a better equipment with which to do the work.

H. H. Walker, retiring president, was named vice-president and chairman of the southern division. Mr. Walker in making the announcement spoke of the co-operation he had enjoyed from all Electragists and, too, the other branches of the industry. He paid tribute to his co-workers in a sincere and simple manner, relinquishing the chair to Clyde Chamblin for the remainder of the meeting.

Edward Martin, Sterling Electric Company, San Francisco, was returned to the post of secretary of the California Electragists.

Glen Arbogast, Newbery Electric Corporation, Los Angeles, and pioneer electrical contractor, opened the afternoon session, Saturday, with a talk on "Progress of the Electragists and the Value of the Organization to the Industry." Mr. Arbogast has a gentle, persuasive manner, and a broad sense of human values. His talk was one of the most effective in the convention, and yet the most quietly spoken.

Mr. Arbogast began with a brief review of state association history, told in a personal and intimate way. He contended that the place of the contractor-dealer was that of the most natural outlet with the public, and one of great importance to the industry. Reviewing extemporaneously the trade policy report, the charts for which still remained on the wall, he pointed out to those who had not previously heard the report, the channels through which much merchandise is shunted to the consumer. The contractor, he showed, had only bought 15 per cent of his materials direct—by passing the jobber—whereas the jobber had sold direct to consumers a much greater percentage.

"If the jobber could realize that he would be in a far better position if he ran his business through the proper channels, I am sure that he would do so," said Mr. Arbogast. "We find ourselves in a desperate situation," he added, "when we run up against competition by jobbers with our own customers. The jobber invariably gives a price concession to get the business, and we of course cannot meet it. Why is it, I ask, that in all the history of price concession it has never been known to happen that a price concession was given to a contractor, one of the regular customers of the jobber. If price concessions are to be given, why can't we contractors get them?"

He warned jobbers that this routing of supplies around the contractor is fraught with danger. The electrical contractor is fixed in the economic scheme of things. He is an absolute necessity. But the jobber is in danger of exterminating himself if he teaches others to by-pass, teaches them to get supplies direct from the manufacturer. Even the central station is not altogether secure in its position because

of possibility of government ownership, he warned, but the contractor, being closest to the ground, is a necessity. Mr. Arbogast closed his talk with a tribute to Harry Walker for his unsparing efforts on behalf of his fellows.

**Water and Power Act Condemned**

Somewhat of a surprise was registered when William A. Cyr, associate editor of the Journal of Electricity, was announced to fill a vacancy on the program. Explaining that political ownership such as proposed in the Water and Power Act was mostly "bunk" and that it would be a relief to "laugh it off," Mr. Cyr, in a burlesque on political ownership spellbinders, provided a comedy relief to the seriousness of the afternoon sessions.

At the close of the burlesque oratorical "course in one lesson," a resolution proposed by C. T. Hutchinson, condemning the Water and Power Act as inimical to the best interests of the people of California and of the electrical industry in all its branches, was passed unanimously.

Mr. Fowler's talk, already referred to, followed and closed the convention.

**Banquet and Prizes**

An impromptu banquet was arranged at one end of the large dining hall on Saturday evening. Singing of "Dixie" as a compliment to Mr. and Mrs. Fowler, the awarding of golf prizes, and a presentation to Harry Walker, featured this informal meeting. A beautiful desk clock was presented to Mr. Walker by Clyde Chamberlin on behalf of the Electragists. Mr. Walker responded in a heartfelt tribute to his co-workers.

The Manning-Bowman trophy for women's golf was presented to Mrs. Lester Siebert. The second prize for women's golf was shared by Mrs. May Kenney and Mrs. Evelyn Rochester. The men's trophy was tied for by Charles Goodwin and Wm. Edwards, both of Oakland, and in a toss-up for first and second place, Mr. Goodwin won possession of the trophy. Arthur Dahl, chairman of the golf committee, presented the prizes.

Ladies attending the convention were elaborately entertained, thanks to the thoughtfulness of the ladies' reception committee, of which Mesdames H. H. Walker and C. F. Butte were chairmen for southern and northern divisions respectively. A bridge party was held the afternoon of the first day, and on Saturday morning the women enjoyed the 17 mile drive around the Monterey peninsula with luncheon at the Pebble Beach Lodge. Informal dancing was engaged in each evening in the grill room of the hotel.

**A. I. E. E. News**

**Los Angeles Section.**—Official personnel for 1926-27 is as follows: chairman, R. E. Cunningham; secretary, L. C. Williams; assistant secretary, H. L. Caldwell; executive committee, Julian Adams, P. S. Biegler, J. C. Gaylord, G. M. Willis; advisory board, R. A. Hopkins.

**San Francisco Section.**—Official personnel for 1926-27 is as follows: chairman, D. I. Cone; vice-chairman,, W. L. Winter; secretary, A. G. Jones; executive committee—W. L. Winter, E. A. Crellin, W. R. Van Bokkelen, G. H. Hagar; joint engineering council representatives—R. C. Powell, D. I. Cone.

**Meetings**

**Pacific Division of Electrical Jobbers Meets at Victoria**

A three-day convention was held by the Pacific Division of the Electrical Supply Jobbers' Association in Victoria, B. C., Sept. 7-9, at the Empress Hotel. Four business sessions were held, at one of which C. E. Patterson, manager of the merchandising department of the General Electric Company, Schenectady, N. Y., made an excellent address on conditions in the jobbing business today. C. B. Hawley, chairman of the division, presided. The

**COMING EVENTS**

**Purchasing and Stores Section, Pacific Coast Electrical Association—**

San Francisco, Dec. 2-3, 1926

**Northwest Association of Electrical Inspectors—**

Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 18-19, 1927

**Pacific Division, Electrical Supply Jobbers' Association—**

Quarterly Meeting—Hotel Del Monte,  
Del Monte, Calif.  
Jan. 27-29, 1927.

convention closed with a banquet at which Roscoe Oakes, vice-president and general manager, National Carbon Company, San Francisco, acted as toastmaster.

One of the outstanding entertainment features was the golf tournament in which J. A. Kahn, of the Capital Electric Company, Salt Lake City, won the jobbers' cup, and C. B. Hawley, vice-president and general manager of the Inter-Mountain Electric Company, also of Salt Lake City, won both the Turner trophy and the Deming trophy.

The next meeting of the division has been set for Jan. 27-29, 1927, at the Hotel Del Monte, Del Monte, Calif.

**Results of Rocky Mountain Golf Tournament in Salt Lake**

W. A. Moser, manager of the Salt Lake City branch of the Westinghouse Electric & Manufacturing Company, won the second annual golf tournament conducted by the Rocky Mountain Electrical Co-operative League of Salt Lake City, in which members of the various branches of the electrical industry participated.

Four "legs" were played, commencing in the month of May, and continuing through June, July and August. About thirty-four contestants entered the tournament. A committee consisting of R. M. Bleak, of the Utah Power & Light Company, W. A. Moser of the Westinghouse company and B. E. Rowley of the Edison Electric Appliance Company handled the tournament and arranged the handicaps. The con-

testants met on days outlined by the committee, the loser of each match being eliminated, the winner being advanced to the next frame until there remained but two contestants. The winner of this match was declared the winner of the "leg."

M. E. Lanning, of the Westinghouse Electric & Manufacturing Company, won the May "leg," J. A. Kahn, president of the Capital Electric Company, the June, W. A. Moser the July, and R. M. Bleak the August "leg." Each of these winners was given a prize of twelve golf balls, and the runner up in each "leg" was given six golf balls.

W. A. Moser and J. A. Kahn reached the final contest, which was won by the former. He will be presented with a suitably inscribed loving cup.

**Farewell Party to Radio Man on Departure for New York**

A farewell banquet was tendered by the business, civic and radio interests of the Pacific Coast, Sept. 14, at the Clift Hotel, San Francisco, to Elmer T. Cunningham, president of the E. T. Cunningham, Inc., who left recently for New York to take up his residence in that city.

That the affair presented a cross-section of the radio industry and business interests of the Coast is evidenced by the list of speakers. During it a complete program of entertainment was presented including a costumed quartet in grand opera numbers, an Italian trio of singers with accordion accompaniment, Vladimir Rossonchine, Russian concert pianist, dancing and solo numbers, an elaborate musical act and other features.

The program itself was divided into two sections. There were twelve speakers who said "goodbye and good luck" to Mr. Cunningham on behalf of the radio industry.

**Book Reviews**

**ELECTRICAL CHARACTERISTICS OF TRANSMISSION CIRCUITS**

Prepared by Westinghouse engineers and compiled by Wm. Nesbit, manager, New York Engineering Division, Westinghouse Electric & Manufacturing Company. Third edition, 1926; 317 pages, 102 tables, 104 illustrations, 9 x 12 in., cloth bound. Published by Westinghouse Technical Night School Press, East Pittsburgh, Pa.

This book represents a 100 per cent expansion over the original edition which appeared in February, 1922. The general subject matter tallies very closely with that of the original issue but has been brought up to date and subdivided more logically and more conveniently. In place of the original 16 chapters the present volume has 22 chapters.

Of particular importance as regards the usability of the book is the fact that great quantities of material highly suited to reference purposes have been included in the volume. The many tables include a wealth of reference material that should be of use to those interested in transmission line calculations.

## Personals

William C. Sterne, prominent in electrical and other business and civic affairs in Denver, is president-elect of the Rocky Mountain Division of the National Electric Light Association. A resident of Colorado since 1895, Mr.



WILLIAM C. STERNE

Sterne has had an interesting industrial career. After engaging in the chemical manufacturing business, and later in the lumber and banking businesses, he started in 1905 a central station which now is known as the Summit County Power Company, Denver. With the Municipal Properties Investing Company he assumed control of the Arvada Electric Company, the Arapahoe Electric Light & Power Company and the Fort Lupton Light & Power Company, all of Colorado, and of the McCook Electric Company of Nebraska. In addition to these interests, he is president of the Littleton Lumber Company and a director of the Denver Chamber of Commerce and of a Denver bank. He is one of the organizers and past chairman of the Rocky Mountain Committee on Public Utility Information. He is a graduate of Harvard and at one period of his career spent some time in Europe in the interests of a fertilizer company. Mr. Sterne is very well known throughout the intermountain territory and always has been an active participant in affairs connected with the electrical industry in that section.

Harry P. LeClair, formerly associated with the New England Electric Company, Denver, is now salesman for Landers, Frary & Clark, covering the states of Colorado, Wyoming and New Mexico.

Thomas T. Richards has severed his connection as vice-president and sales manager of the Wagner Electric Corporation, St. Louis, after an association of twenty-one years with that company to become sales manager of the Arthur B. Shepard Corporation, New York City, manufacturers of structural steel buildings.

Fred Skeel, Western sales manager of the Crouse-Hinds Company, Syracuse, N. Y., has been visiting local jobbers in Los Angeles. This is Mr. Skeel's first trip to the Pacific Coast in five years.

H. W. Dennis, who has been construction engineer since he joined the Southern California Edison Company in 1909, has been made chief civil engineer, the title of construction engineer having been abandoned. Graduating from Cornell University in 1899 with the degree of C.E., Mr. Dennis almost immediately entered the services of the Niagara Falls Power Company, remaining with that company until 1909, when he moved to Los Angeles and began work with the Southern California Edison Company. Mr. Dennis is a member of the committee on arch dam investigation of Engineering Foundation and, as a member of the subcommittee of that committee, has had charge of the construction of the experimental arch dam which has just been built in Stevenson Creek, in Fresno County, Calif.

C. J. White, Western representative of the Tork Clock Company, not long ago spent several weeks at the company's New York office and factory on business.

A. L. Miltenberger, Pacific Coast manager of the Wagner Corporation, San Francisco, and A. E. Herzberg, manager of that company's transformer sales division, St. Louis, recently spent several weeks in Los Angeles in an endeavor to familiarize themselves with the needs of that territory.

J. C. Davidson, manager of the electrical department, Hendrie & Bolthoff Manufacturing & Supply Company, Denver, completed a business trip in the Western Slope territory prior to his attendance at the Glenwood Springs convention.

W. A. White and Harold T. White of New York City, directors of The Washington Water Power Company, Spokane, visited the properties of that company lately.

R. F. Monges, engineer in the General Electric Company's San Francisco office, returned not long ago from spending six weeks in the East in attending various meetings of General Electric engineers and in visiting the Pittsfield, Schenectady, New York and Philadelphia offices and works of that company.

C. C. Hillis, Jr., formerly city sales manager for the Electric Appliance Company, San Francisco, now is connected with the Sunbeam division of the National Lamp Works in that city.

S. J. Lisberger, of the engineering department of the Pacific Gas and Electric Company, San Francisco, represented the Engineering Section, P.C.E.A., at the executive committee meeting held in Chicago during the first group meeting of the Engineering National Section Oct. 13-15. Mr. Lisberger, who is past chairman of the P.C.E.A. Section, acted for J. G. Rollow, present chairman, who was unable to attend.

J. M. Perlewitz, of the Graybar Electric Company, B. C. J. Wheatlake, of the General Electric Company, B. E. Rowley, of the Edison Electric Appliance Company, and D. C. Green, of the Utah Power & Light Company, all of Salt Lake City, attended the recent National Electric Light Association convention, Rocky Mountain Division, at Glenwood Springs, Colo.

Edward Woodbury, engineer of Stone & Webster, Inc., Los Angeles, was one of the guests at a recent meeting of the San Francisco Electrical Development League.

W. D. Brill, formerly connected with the Electric Appliance Company, San Francisco, now is connected with the Gilson Electric Appliance Company, Oakland, Calif.

Harry H. Daly, sales manager, Majestic Electric Appliance Company, San Francisco, is making a business trip to important trade centers in the Middle West, contacting with jobbers and dealers in that company's waffle irons and air-heating equipment.

H. H. Jones, vice-president and general manager, Western States Gas & Electric Company, Stockton, Calif., visited in San Diego, for a few days a short while ago. Mr. Jones was for many years president of the San Diego Consolidated Gas & Electric Company.

Allan Hendricks, chief of the high-voltage laboratories and shops of the General Electric Company, and designer of the transformers and much of the special equipment at the Ryan laboratory at Stanford University, recently spent about three months in San Francisco and environs, primarily in connection with installing the 2,100-kv. equipment in that laboratory.

Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, Denver, was a welcome visitor to San Diego recently.

Harry L. Walther, for many years identified with the utility business in southern Oregon, and more recently manager of the Southern Oregon properties of the California Oregon Power Company, Medford, recently has been chosen manager of the Oregon Public Utility Information Bureau, with offices in the Pacific Building, Portland. Mr. Walther was born in Jackson, Calif., in 1869, and after his school days, which were spent in Sacramento, entered the service of the Southern Pacific Railway Company in 1887. After nine years in the motive power department of that company he became general manager of the Yreka Railway Company, a position he held for fifteen years. Then in 1911 he entered the power business as general manager of the Rogue



HARRY L. WALTHER

River Electric Company, Medford, Ore., a subsidiary of the Siskiyou Electric Power Company. In the following year when that company was consolidated with other properties under the ownership and operation of the California Oregon Power Company Mr. Walther was made manager of the southern Oregon properties of that Company, and held that position until he was chosen by the utility companies of the state to head the reorganized Public Utility Information Bureau.



**H. H. Allison**, who has been associated with the sales staff of the Great Western Power Company, San Francisco, has joined the Coast Counties Gas & Electric Company, Santa Cruz, Calif., in the capacity of refrigerator salesman.

**W. H. Ude**, director of public relations, The Washington Water Power Company, will be commander of the Community Chest campaign this winter at Spokane.

**Ralf R. Woolley**, hydraulic engineer of the U. S. Geological Survey, and **C. E. Norden**, associate hydraulic engineer, recently returned to Salt Lake City after a survey of the upper Green River basin in connection with his report on the Green River.

**John C. Campbell**, formerly traveling auditor for the Pacific Power & Light Company with headquarters at Yakima, Wash., and now manager of the preferred stock department of the Birmingham Electric Company, Birmingham, Ala., recently paid a visit to Portland. En route he visited Dallas, Denver, Los Angeles and San Francisco.

**Harold L. Doolittle**, chief designing engineer of the Southern California Edison Company, Los Angeles, has been appointed chairman of the hydraulic power committee of the National Electric Light Association. Mr. Doolittle was graduated from Cornell in 1906 with the degree of M.E., entering the service of Crane Company in Chicago immediately. Resigning that position in 1907, he spent two years in the office of E. S. Cobb, consulting engineer, with offices in Los Angeles. Mr. Cobb during this time was acting as consulting engineer for the Pacific Light & Power Corporation of Los Angeles in the construction of the Redondo Beach steam plant. In 1909 Mr. Doolittle entered the employ of the Southern California Edison Company as draftsman, and immediately began the work of designing the original installation of the Long Beach steam plant. In 1918 he was



HAROLD L. DOOLITTLE

appointed assistant construction engineer of the Edison company, becoming chief designing engineer Aug. 1, 1926. Mr. Doolittle is also secretary of the Hydraulic Division of the American Society of Mechanical Engineers. In addition to his unquestioned reputation as an engineer, Mr. Doolittle has acquired considerable fame for his ability in etching. Three of his etchings are now on exhibition at the Sesquicentennial Exposition in Philadelphia.

**Edgar C. Gribble** of San Francisco and **A. M. Campbell** of Los Angeles, represented the Electrical Specialty Company, Inc., Pacific Coast representatives of the Mica Insulator Company, Schenectady, N. Y., at the latter's recent sales conference in that city.

**E. F. Rhodenbaugh**, of the faculty of the Idaho Technical Institute, Pocatello, recently spent some time studying corrosion of the cables of the underground system of the Idaho Power Company, Boise, and of the cooling water supply at the Boise substation.

**Fred B. Lewis**, assistant general manager of the Southern California Edison Company, attended the convention held by the Association of Edison Illuminating Companies, in Quebec, Canada, Sept. 27-Oct. 2. Prior to his departure Mr. Lewis acted as chairman of the day at a Los Angeles Electric Club meeting.

**A. Manfield** has been placed in charge of the newly opened salesroom of the British Columbia Electric Railway in Chilliwack, and **A. J. McWean** has been transferred from the Vancouver office as outside salesman.

**Henry Yost**, Pacific Coast sales manager, Trumbull Electrical Manufacturing Company, San Francisco, spent considerable time in Seattle and the Northwest recently. While in that section he attended the Pacific Coast convention of the Electrical Supply Jobbers Association in Victoria, B. C., accompanied by **J. L. Beebe**, Northwest representative of the Trumbull company.

**A. R. Markwart**, vice-president in charge of engineering, Pacific Gas and Electric Company, San Francisco, **R. A. Monroe** and **E. C. Johnson**, engineer and manager, respectively, of the company's Colgate division, accompanied by **S. J. Norris** and **R. C. Tyler**, engineer and manager, respectively, of the Oroville-Wyandotte Irrigation District, recently made a tour of inspection in connection with an investigation to ascertain the possibilities of power development in the district.

**F. H. Woodward**, general sales manager, Great Western Power Company, San Francisco, accompanied by **T. E. Ward**, manager of the company's northwestern division, visited St. Helena, Calif., a short time ago.

**E. Zinsmeyer**, vice-president, Frank Adam Electric Company, with headquarters in Los Angeles, recently spent a short time in San Francisco en route north.

**Clarence R. Hunt**, formerly manager of the San Francisco branch of The Robbins & Myers Company, has been transferred to that company's main office and factory at Springfield, Ohio. **H. S. Jones**, who has been connected with the San Francisco sales organization, succeeds Mr. Hunt.

**Dr. Samuel Stuart Mackeown**, a recognized authority on the design of high-power vacuum tubes and their use, has been appointed assistant professor of electrical engineering at the California Institute of Technology, Pasadena. Dr. Mackeown goes to the institute directly from the vacuum-tube research department of the Westinghouse Electric & Manufacturing Company in New York where he has been working on the development of high-power vacuum tubes. After receiving his doctor's degree from Cornell University in 1923, he was a National Research Fellow for three years at the California Institute where he worked

in co-operation with Dr. Millikan on problems relating to the detachment of electrons from cold metals.

**John F. Greenawalt**, publicity manager of the Mountain States Telephone & Telegraph Company, and the recently elected president of the Colorado Public Service Association, entered the telephone industry from the newspaper field twenty-three years ago. He joined the contract department of the old Colorado Telephone Company after moving to Denver from Florence, Colo., where he was editor and publisher of one of the state's pioneer journals, the Florence Tribune. He gradually took over the publicity and advertising ac-



JOHN F. GREENAWALT

tivities of the company and has been in his present post for the past sixteen years. Mr. Greenawalt went to Colorado from Michigan. He is widely known throughout the Intermountain region in his capacity as an advertising man and a telephone executive. He will close his term as governor of the Colorado-Wyoming district of Kiwanis International on Jan. 1 next. He has been president of the Advertising Club of Denver and recently completed a term as chairman of the eleventh district of the International Advertising Association. As a member of the senior council of the local advertising club he will take a leading part in the 1927 convention of the International Advertising Association and the Public Utilities Advertising Association which are to meet in Denver next June. He is a member of the Denver Athletic Club, Wellshire Country Club, Mount Vernon Country Club, Denver Press Club and Colorado Editorial Association.

Obituary

**C. I. McColgan**, of the C. I. McColgan Company, dealer in incandescent lamps, San Francisco, died recently.

**Emil Newman**, for more than twenty years engaged in engineering work for the San Joaquin Light & Power Corporation, Fresno, Calif., for the last few years in a consultant capacity, died near Azusa, Calif., Oct. 3. He was 72 years of age.

**Sir Ernest Maes Harvey**, a director of the British Columbia Electric Railway Company and a partner of Allan, Harvey & Ross, bankers of London, England, died in London Sept. 13.

## TRADE NOTES

The Edwin F. Guth Company, St. Louis, is distributing a folder just off the press describing its new and improved Aglite porcelain enameled illuminators. In addition to the regular Aglite features the new Aglite has an oval-shaped canopy permitting installation in narrow spaces; is made in keyless and pull-chain types; either type may be had with small plug-in receptacle in canopy for attachment of electrical appliances; has a smaller opal glass shade designed for new type Mazda lamp, and a shorter over-all extension. The new Aglite is adaptable to more uses, smaller in size, more symmetrical and lower in price, according to the folder.

The Pittsburgh Transformer Company, Pittsburgh, has issued Bulletin 2057, descriptive of the Pittsburgh polyphase transformer. The folder points out that, in addition to having all the inherent advantages of the 3-phase transformer, the polyphase transformer has all the advantages found in the operation of three single-phase transformers. Among other advantages are its noiseless operation, making it of particular interest to the power company whose substation are in residential sections, saving in space and in cost of installation. Copies of the folder may be had upon request.

The American Cable Company, New York, recently issued a handbook that contains much data that should prove invaluable to wire rope users. How to measure wire rope, how to and how not to uncoil or unreel wire rope, how to make an endless splice, how to seize rope properly, how to socket wire rope correctly, how to care for wire rope when both in and out of service, are just a few of the things told in the 88-page handbook on wire rope.

Century Electric Company, St. Louis, has announced new prices, effective Sept. 13, on its Type RS repulsion-start induction single-phase motors,  $\frac{1}{2}$  to 40 hp., and on its Type SC squirrel cage induction two and three-phase motors,  $\frac{1}{4}$  to 50 hp. The company has issued, "There Is a Difference That Makes Them 'Keep-a-Runnin'", a folder descriptive of its Type RS motors.

Farnham & Cunningham, electrical and sales engineers of Los Angeles, have announced that they now represent the Wagner Electric Corporation of St. Louis in southern California territory in connection with transformers, both distribution and power.

Mathias Klein & Sons, manufacturers of tools for linemen, electricians and mechanics, Chicago, recently issued its catalog No. 26. The 56-page book, which is particularly attractive on account of its clear printing and uncrowded appearance, contains numerous illustrations of the tools carried, in addition to descriptions, sizes and weights. A feature of special interest is a number of full-page illustrations showing the application and advantages of certain tools. Copies of the catalog may be had upon request.

Ludlum Steel Company, Watervliet, N. Y., has announced that with its Delhi tough rustless iron it has been able to solve the problem of providing practical metallic recuperators for furnaces. Metallic recuperators have been known for some time to be the most desirable type of fuel economizer for heating furnaces, but unfortunately not many materials have been available for this purpose, says the announcement. With Ludlum Delhi tough rustless iron production in the furnace is increased greatly, with a fuel economy of 20 to 30 per cent.



"Run up the Jolly Roger, my hearties, and let's away to Jamaica to find the wrecked Spanish galleon's treasure! I've a chart of the course and a map marked with a bloody cross to show where the pieces of eight lie hid!" 'Tis Captain Kidd or Long John Silver or Blackbeard! No, 'tisn't. 'Tis "Bill" Neelands of the San Francisco branch of the Graybar Electric Company who took a leading part in the skit, "Treasure Hunters," presented at the recent semi-annual sales conference held by the company's San Francisco and Oakland houses. The playlet is described as "a play in one act (but no actors) and in one scene (but no scenery)."

The Timken Roller Bearing Service & Sales Company, Canton, Ohio, has announced the appointment of R. C. Brower as general manager. Mr. Brower will make his headquarters in Canton at the main plant of the Timken Roller Bearing Company, but will devote a great deal of his time to maintaining contact in the field. He is well known in the bearing industry, having been associated with it since 1913, for the past four years with the Timken company, in both the automotive and industrial machinery sales divisions.

The George W. Dunham Corporation, Utica, N. Y., manufacturer of the Dunham Whirldry washer, has been combined with the Winchester Repeating Arms Company, New Haven, Conn. Although the Winchester company has purchased the controlling interest, the Dunham organization will retain its identity as a separate company but will move to the Winchester plant at New Haven. George W. Dunham, inventor of the Whirldry washer, who becomes vice-president and director of the new concern, will continue in charge of engineering. James McClymont, former vice-president and sales manager of the Dunham corporation, will continue under the new regime as vice-president in charge of sales.

U. S. Electrical Manufacturing Company, Los Angeles, has issued Vol. II, No. 1, of its U. S. Motor News. "Guarding a Great City's Life and Industry," an article on the Los Angeles aqueduct system, with numerous attractive cuts, is the main feature of the paper. There is a number of shorter articles on U. S. AutoStart motors.

Driver-Harris Company, Harrison, N. J., has published data book R-26, "Alloys and Electrical Resistance," that contains up-to-date data in connection with Nichrome and the other various D-H alloys used for heating elements in electric heaters of all kinds. Description and application, properties and price lists are given of Nichrome IV, Nichrome, Comet, Advance, Lucero and Manganin, the Driver-Harris alloys, and a number of temperature resistance charts are furnished as well as numerous tables and much other useful data. The book is most comprehensive and should be of particular value to electric heating engineers.

George Richards & Company, Chicago, manufacturers of Hemco products, have announced their fall merchandising and sales campaign which centers about the Hemco display stand. This is a metal stand mounting the three Hemco plural plugs, the Hemco appliance plug and the Hemco attachment plug. The items are secured gracefully on the stand in such a way that they can be removed and sold when the board has outlived its usefulness. At periodic intervals broadsides are mailed to dealers, urging them to display this stand. These broadsides also contain merchandising ideas for dealers to use in securing more sales by use of the Hemco display stand. Letters, advertising in trade journals and the Liberty Magazine, which will afford a direct dealer tie-in, and six different plans of co-operation for jobbers are part of the campaign.

The Sta-Warm Electric Heater Corporation, formerly of Minneapolis, Minn., has purchased and now occupies at Ravenna, Ohio, a new and fully modern manufacturing plant which affords it several times its former production capacity.

Johns-Manville, Inc., San Francisco, is occupying new offices at 159 New Montgomery Street, having recently removed from its former quarters at 500 Post Street.

The Western Theater Supply Company and The Theater Equipment Company, both of San Francisco, have been consolidated and will be known as the National Theater Supply Company, with headquarters at 121 Golden Gate Avenue.

# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES



*The only Washer in the World Guaranteed 20 years*

IT is only fitting that a western industry, so intimately a part of the tremendous electrical development of the West, should be first to inaugurate washer improvements.

Guided by this experience, and by the careful observation of more than a quarter century, the Johnson Washer Company knows beyond the shadow of a doubt what the Johnson Washer is capable of.

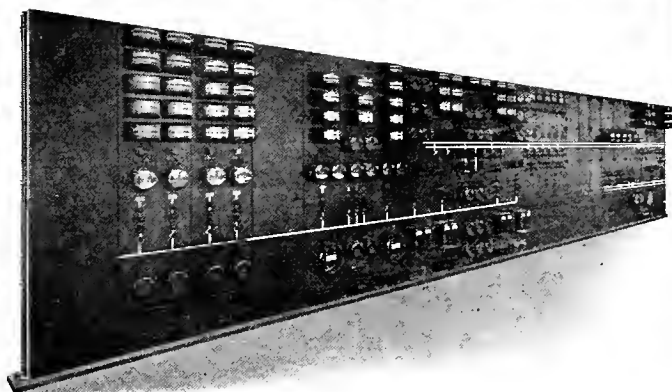
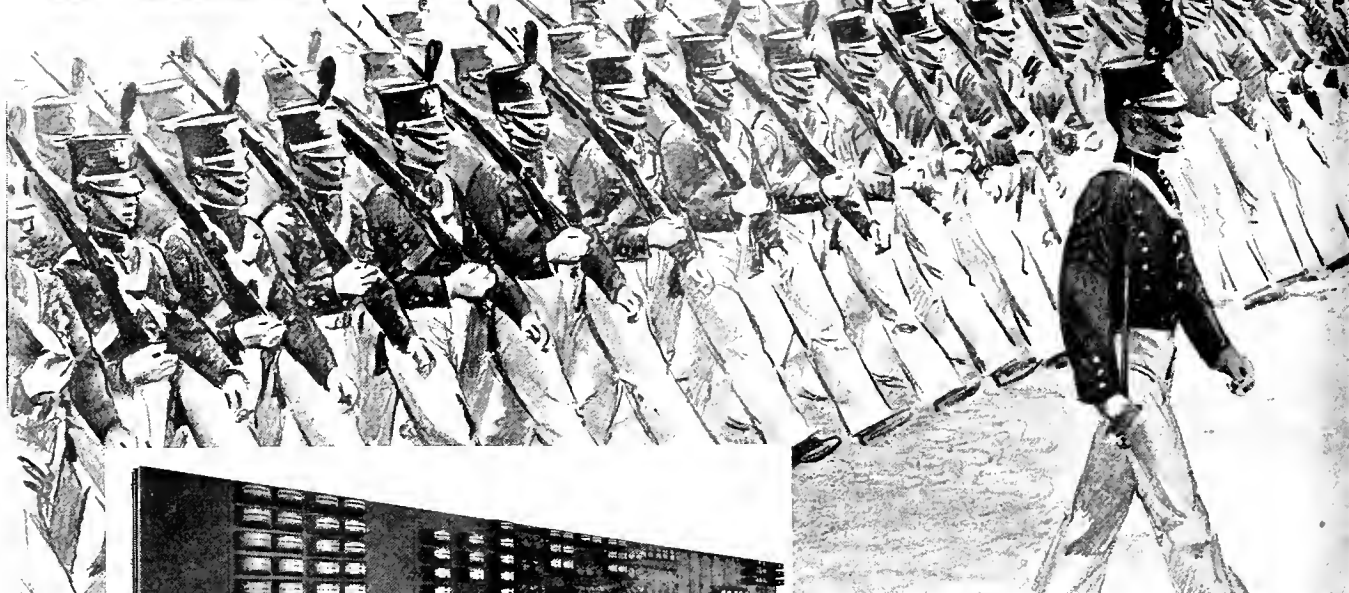
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**JOHNSON WASHER COMPANY**

*Oldest and largest manufacturers of washers in the West*

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# TEAM WORK



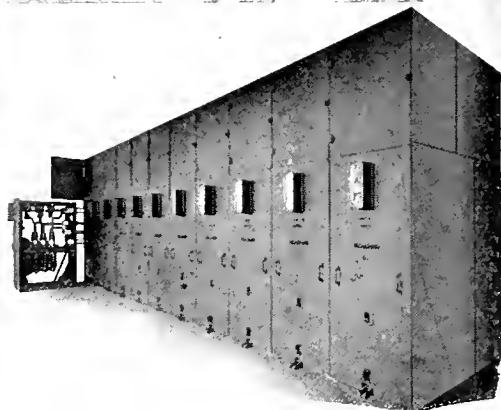
*Left!—Left!—with machine-like precision every foot and arm swings forward as one. Imagine the effect that one man out of step would have on that perfect line of march! But it never happens. Each individual does his part exactly right.*

The same sort of teamwork from engineer to inspector must be developed to build switchboards that are one hundred per cent right. The Condit organization possesses the facilities to design and build the type and size of switchboards that will meet your exact requirements and the teamwork to make them as near perfection as humanly possible.

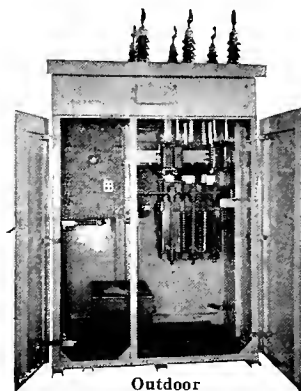
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Seattle, San Francisco, Los Angeles

For safety enclosed switchboards — removable truck type — benchboards, electrical and manual controlled switchboards, get in touch with Condit.



Safety Enclosed Switchboard, Removable Truck Type



Outdoor Switch House

# CONDIT



# Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

Devoted to the Economic Production and Commercial Application of Electricity

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## Christmas Merchandising

ONCE more the Christmas shopping season opens. Once more electrical merchandise should constitute a large percentage of the Christmas gifts given in these electrified eleven Western states. Once again the live merchandiser will have an opportunity to build up sales, good will, and establish himself in his community.

Competition will be keen, keener than last year, possibly. Every manufactured product even remotely connected with gifts and giving is being brought forth as something to be given this Christmas. It is no time for the merchandiser to sit back and rest upon his laurels. Merchandising profits will go only to those who work for them.

Interested in rendering genuine sales service to its merchandising readers the Journal of Electricity in its Better Merchandising section will present attractively and succinctly in the next issue, that for Nov. 15, complete Christmas selling plans and ideas. The most effective selling ideas of last year will be reviewed. A number of new ideas in selling for this year will be offered. Photographs of clever and result-getting window and store displays will be reproduced that others may adapt them to their uses.

The Christmas merchandising service has now become an annual feature of the Journal of Electricity. This year it is designed to be more useful to you than ever before.

McGraw-Hill Publishing Company, Inc.  
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Industrial Engineer

Electrical Merchandising

Chemical and Metallurgical Engineering

American Machinist

Successful Methods

Electrical World

Electric Railway Journal

Engineering and Mining Journal

Bus Transportation

Engineering News-Record

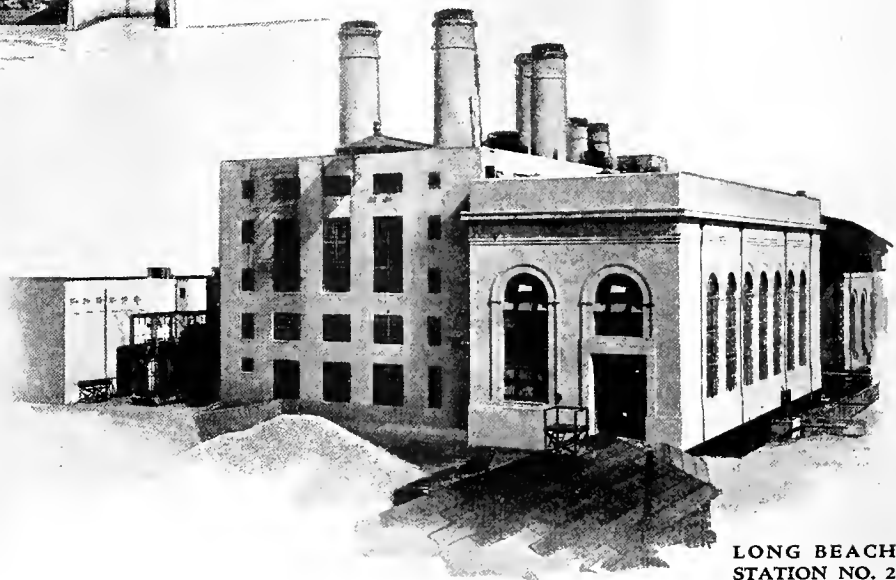
Coal Age

Radio Retailing

Power



**EDGAR STATION**  
The Edison Electric  
Illuminating Company  
of Boston.



**LONG BEACH,  
STATION NO. 2**  
Southern California  
Edison Company.

**STONE & WEBSTER** built both in 1925.  
Now doubling the power for both clients.

# STONE & WEBSTER

INCORPORATED

BOSTON, 147 Milk Street  
NEW YORK, 120 Broadway  
CHICAGO, First National Bank Bldg.

PHILADELPHIA, Real Estate Trust Bldg.  
SAN FRANCISCO, Holbrook Bldg.  
PITTSBURGH, Union Trust Bldg.

# EDITORIAL

## The Ridiculousness of of the Superlative

SUPERLATIVES have little credit, except once in a while. The "largest" this or that and the "first" something else seems always destined to fall into the class of "one of the" largest or first when someone builds larger or discovers that his particular accomplishment antedates the other fellow's by fifteen minutes and six seconds. Among central stations there seems to be a particular complex which almost demands that there be something without paragon about each system. Particularly when boasting of achievement is the statement likely to be made that a certain company possesses either the first, longest, highest, largest or earliest something or other. As time passes, in order to keep the sovereignty, these record achievements begin to carry modifiers until they become ludicrous, if not almost meaningless. Which reminds us of a small company which many years ago started out with a "world record" span. As time passed the record dwindled until, if it were to be superlative at all, it was spoken of as the "longest span under 25,000 volts across a body of salt water in Blank County." Today if the span were to be classed among the "records" the company would have to add to the description "painted blue."

## For Sounder Development of Electric Refrigeration

WHAT about electric refrigeration? This latest contribution of the industry for the betterment of mankind has swept the country like wildfire. What might be termed the first year's effort of the industry to sell this latest service is almost over. There have been many trials and tribulations; conditions have been far from stable; lessons have been learned that will have important bearing upon the future development of this great field.

In an effort to bring to bear the best thought and experience of the industry both to assist in the stabilization and to guide future development, the McGraw-Hill electrical papers have conducted a nation-wide survey. Men in all branches of the industry were interviewed personally in more than 200 cities. A mass of data, facts, opinion and experience has been gathered, tabulated and analyzed. The situation as it exists in the Western states is presented on another page of this issue. Comparisons are made between Western and national conditions, but the national situation is discussed at greater length in *Electrical World*.

It may be surprising to Western men to know that in comparison with other sections of the coun-

try a poor job has been done in this territory. There have been many contributing factors—too many to set down here. The fact remains that with a territory which often has been referred to as one of the most fertile fields for this latest electrical application, the industry has not made the best of its opportunity. The reasons are discussed in detail in the article in this issue. Conclusions are drawn from the facts and opinions of the men interviewed which may serve to improve the job next year. These are offered to the industry for what they are worth.

Despite the difficulties experienced by the industry in the Western states as reported in the survey, there is a definite feeling of optimism regarding the prospects for 1927. Sales quotas double and treble those of the past year are reported. Moreover there is an unanimity of feeling that the experience, bad, good or indifferent, gained during the current year will more than offset the poor showing made and will enable central stations, distributors and dealers to meet the new quotas.

Opportunity is taken at this time to thank publicly the hundreds of men in utilities, distributors' and dealers' organizations who have made this survey possible. Without the hearty co-operation of these men the survey could not have been made. The industry owes a debt of gratitude to them for the manner in which they gave freely of their time, experience and opinion in the hope that refrigeration development may be put on a sound, constructive and profitable basis.

## The Five Commissioners Named by the Proposed Housewives' Bill

THE Housewives' Council of Portland in its initiated water and power bonding amendment to be voted upon by the people of Oregon on Nov. 2 gave the voters some satisfaction when it named in the measure the commission of five who would administer the \$52,000,000 to be raised for the purpose of engaging the state in the business of developing and selling electric energy. The people of the state are indebted to the "Oregon Voter" for brief biographical sketches of these proposed commissioners in which the training and experience of each candidate are set forth fully. We are indebted to the same publication for the excerpts from these biographies which are presented here for the information of the electrical industry.

The first commissioner is an automobile and radio dealer with a business college education and a general mercantile experience. He is reputed, according to the "Oregon Voter," to have filings on the

waters of Clear Lake, a body of water which has possibilities from a power-and-water-supply standpoint. The second candidate is a retired farmer and dairyman, seventy-four years old, a former member and president of a small-town water commission and active in civic affairs. The third is a fertilizer salesman, ex-farmer, former member of the state legislature and once candidate for governor. The fourth, a woman, has been active in community affairs in Portland, a former school teacher and one of the leaders in the movement to secure the franchise for the women of Oregon. She is chairman of the research committee of the Housewives' Council and has long been a student of utility rates. The last member is secretary-treasurer of a laundry company, has been active in both city and state politics for many years and has been a "persistent, visionary, denunciatory and recurring advocate of municipal ownership."

The people of Oregon are allowed no opportunity to select as members of the commission those whom they might deem best qualified from the standpoint of previous technical and business experience. It is doubtful if they will entrust the sum of \$52,000,000 to the administration of the body named. At least such should prove a good talking point for those who are opposing the proposed measure.

#### "The Nation" and its Russian Love Affair

AS long as that provocative mouthpiece of the sad, fierce thinkers, *The Nation*, confines its introspective gaze to intellectual and cultural topics, it is an interesting and sometimes amusing periodical. To those who can take their "Nation" or leave it alone it affords a view always contrary to the accepted view and as such provides exercise for the active mind, willy-nilly.

Yet when the very serious and very sarcastic young men who write for that journal of radical thought take it upon themselves to speak of facts and of matters pertaining to actual working institutions, they do what all people who wade in beyond their depth do, namely, they flounder about in a highly comical manner. Their antics, particularly with respect to high-sounding criticisms written in an abused tone of the so-called "power trust," invented by them and blamed with all sorts of dire things in past Water and Power Act campaigns, are antics of the schoolboy thrown into a fright by a Hallowe'en spectre.

It is with amusement, then, that one reads in the Oct. 6 number of *The Nation* the editorial "Hugh Cooper Touches a Dream." The dream, it seems, was Lenin's; therefore, it must have been quite a dream. Anything Lenin dreamed was perfect, if one is to take *The Nation* seriously, and strange as it may seem, there are people who do.

How is the dream coming true? Hugh Cooper, American electrical engineer, backed by American capital—even so—has gone to Russia and there obtained important concessions. He has built and will build a number of large hydroelectric projects for the Soviet government. It is the fulfillment of

Lenin's dream and all that sort of thing. And because it is being done for the Soviet Union it is somehow a noble and a holy thing.

As usual *The Nation* does a double somersault in the last paragraph. How wonderful this blazoning of Russian villages with light, it says, with foreign commercial agents selling turbines and apparatus, while the United States "tries to sell Muscle Shoals and other American power projects to gentlemen whose primary interest is to make money out of them."

Really, now, just what are the gentlemen who sell generators to Russia selling for? What purpose, is one to suppose, moves the gentlemen who are loaning money and financing those projects in Russia, operating under Soviet concession? Surely these are gentlemen whose primary purpose is to make money out of those projects. And yet, because they are doing this "for Russia," is it that somehow their transactions are ennobled and enshrined in miraculous ways? Aren't the editors of *The Nation* just a bit ridiculous?

For some years this strange love affair has gone on. *The Nation*, saddened and burdened with American idiocyncrasies—and America has them no less than Russia perhaps—has devoted itself most assiduously to this rougher sweetheart, one with fire in her eye and ideas in her head.

Like all lovelorn swains, *The Nation* loves on blindly. Anything Russian is something superior, something exalted. Hence, when Hugh Cooper builds power projects in the land of Soviet—and in justice to Mr. Cooper the projects he is building will rank among the finest in the world and render a great public service to Russia—albeit he and his companions shall derive from them profit for themselves, *The Nation* considers them more important by far than any of the more truly communal customer-owned enterprises in its own nation, America.

In another column of this same Oct. 6 number *The Nation* goes into raptures over the fact that union workers in New York are building their own apartment houses. What essential difference is there in customer-owned utility building of power plants, except that the utility is owned by all classes of people, workers of brain as well as of brawn, instead of just of one single class?

There is really considerable to fall in love with in America, too.

#### Governor Hunt Displays His Superiority Complex

WITH the new science of psychoanalysis what it is, a brave person indeed it is who exhibits his complexes to the naked eye. The least aberration from what is known as normal lets one in for a searching analysis of hidden motives, influenced, it is said, by some untoward event in his childhood days.

Be that as it may, Governor Hunt of Arizona seems to fling to the winds possibilities of such analysis of his motives, for in a recent press report he is said to have declared the entire Boulder Canyon project dependent upon his *aye* or *no*.



"As long as I am governor," he is quoted as saying, "no dam shall be built at Boulder Canyon. Arizona has 43 per cent of the watershed and furnishes 23 per cent of the water in the Colorado, and California, furnishing none, shall get none."

The picture which comes to mind on reading such a statement is one of Governor Hunt, arms akimbo, standing in the gorge at Boulder Canyon whose sides tower 1,000 ft. above him, defiant and resolute, a Canute commanding the tide to cease, shrieking, "They shall not pass." The spectacle is somewhat disproportionate to Governor Hunt's real importance, and no doubt your good psychoanalyst seeing it would smile knowingly and murmur, "Gottmensch complex."

Moreover, if the attitude is to be interpreted as a reflection of childish events, it is not surprising. The entire attitude of Arizona, through its mouth-piece Governor Hunt at least, has been extremely childish. It is the dog-in-the-manger attitude translated into political bonfires.

It is to be regretted by every adult—as opposed to childish—individual that the development of the Colorado, a man-sized job, and the protection of Imperial Valley from flood danger, a truly grown-up responsibility, should be delayed.

#### The Poet of Power,

#### Charles H. Peirson, Passes On

"CHARLIE" PEIRSON, as he was known to the "Fourth Estate" throughout the West, passed on, Monday, Oct. 18, and brought to an end a romance which was not to be rivaled by any of those his imagination had created from the story of the development of electricity. Though himself the poet laureate of power development, the creator of the concept, "white coal," his own story from the time he began his writings at 12 years of age, through his experience on many newspapers as reporter, special writer and war correspondent, syndicate writer and poet, besides the very successful job of acquainting the world with the meaning of power development, was itself no less a vivid though unwritten romance.

The electrical fraternity, of whom he sang praises through every newspaper in the country, was not as well acquainted with Charles Heston Peirson, assistant vice-president of the Southern California Edison Company and for more than twenty years that company's director of public information, as was the newspaper fraternity of the country. This in itself is a remarkable characteristic. The interpreter of the electrical industry to the public was less known to his industry than to the public. Yet the industry's debt to him is no less great, rather it is a more real debt in every sense.

Those who are gifted with the imagination, the sense of values, as well as the faculty of expression, to translate the mechanical—and to some of us—unromantic, details of every day into terms of achievement and drama, are rare indeed. Often they are an institution's most productive agents. They write down their industry's activity in terms that the average person may understand and imbue it with interest and the glamor of romance. There-

after, in the light of the interpretation these individuals are able to give to the ordinary deeds of an industry, these works are seen by that industry itself as accomplishments of which its members may be proud.

"In the passing of Mr. Peirson our corporation and, indeed, California, has lost one of its most constructive influences in its development," said John B. Miller, president of the Southern California Edison Company. In these words he expressed an universal opinion.

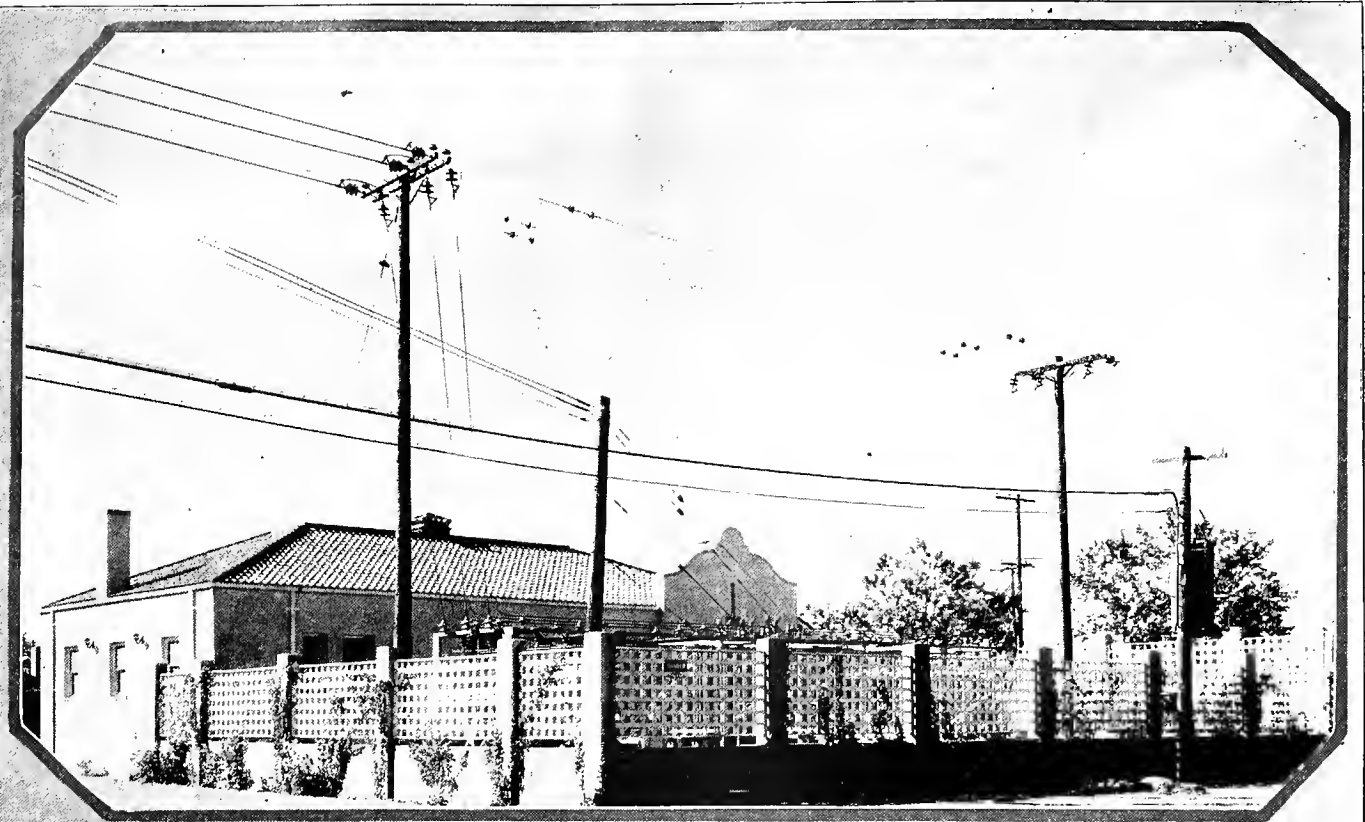
#### Radio Broadcasting from a Public Relations Standpoint

FOR some time speculation has been rife as to whether or not radio could be used effectively by the electric utilities from an advertising, publicity or public relations standpoint. Here in the West sporadic attempts at broadcasting have been made by one or two utilities, in one instance with considerable favorable public reaction. Others have considered broadcasting as an adjunct of a public relations program but for some unaccountable reason have done nothing. These can well afford to take a lesson from the New York Edison Company. What broadcasting has meant to this utility was explained recently by Arthur Williams, vice-president in charge of commercial relations. Mr. Williams said:

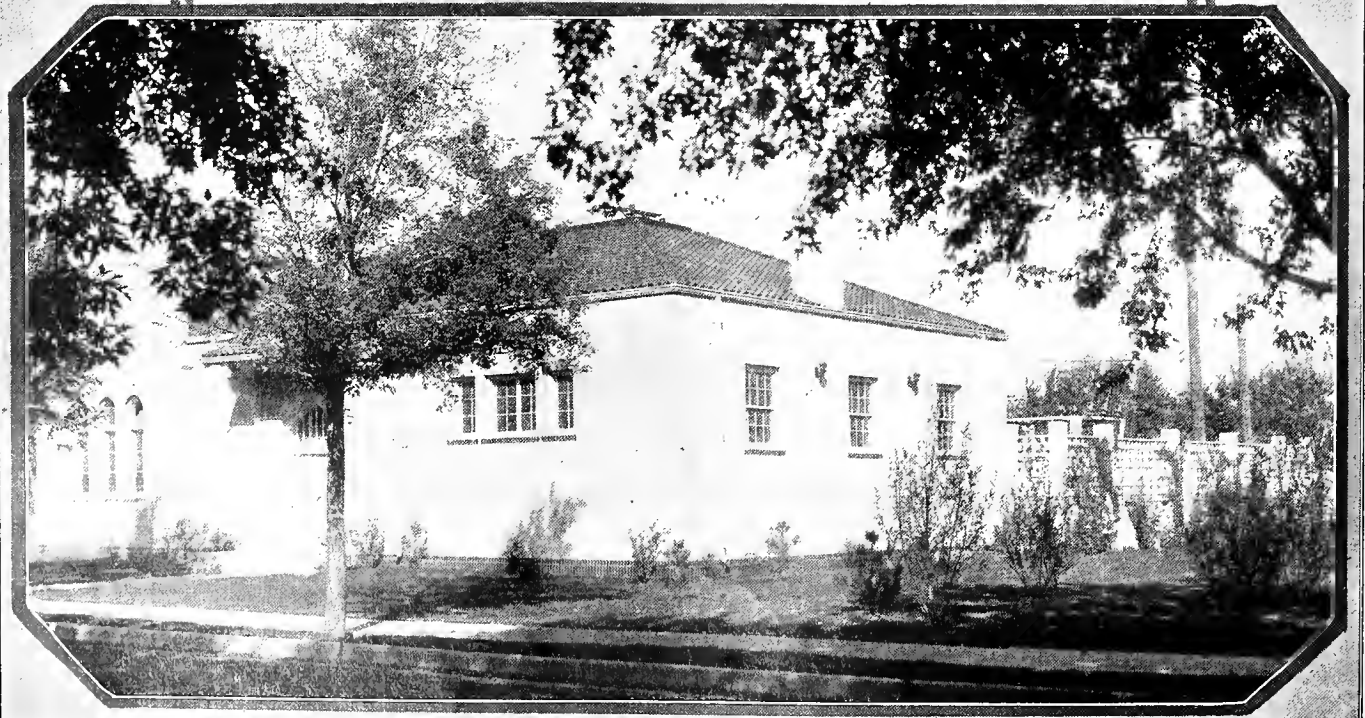
"Through the utilization of the radio and the establishment of the Edison Hour, the company is seeking to restore, at least in part, the former personal relation which was possible with all of its customers when the number was comparatively small. This, of course, cannot be accomplished as fully as the company would desire. But to a certain extent the radio gives opportunity to explain the various phases of the company's service, and its desire to keep in closest possible touch with its customers and the public, in the hope of establishing, through mutual effort, the highest standards of service.

"In all of this there is no thought of advertising. The broadcasting program of the company has been kept entirely separate from its advertising, in the belief that the newspapers of the city provide by far the best advertising medium. In fact, during the past year the company's advertising appropriations have been increased, rather than reduced because of its broadcasting activities. The company feels that its own use of the air should be confined to education and entertainment, recognizing that, through the Edison Hour, it is entering the homes of its customers and the public, in at least a sense, as a guest and it does not wish to do anything which might be considered as trespassing upon their hospitality."

The recent announcement that the Standard Oil Company will take up broadcasting, as well the success enjoyed by other companies that have entered this field, can be taken as an indication of the trend in this direction. At any rate, utility executives can afford to give the subject of broadcasting more than a passing thought.



ONE of Denver's nicest appearing residences proves to be a modern substation. Appearances are being taken into consideration more seriously in the construction of substations than ever before in the history of the electrical industry. This is a creditable step in the progress of the industry and one that is in keeping with a sound policy of public relations. A substation with suitable landscaping that is an addition to the beauty and attractiveness of a community is a proof of sincerity readily understood by the general public. Harrison substation of the Colorado Public Service Company, shown from the front and rear in the accompanying views, is an unattended station providing regulated residential service. Circuits are arranged for self-reclosing.



# Status of Electric Refrigeration in the Western States

“WRITE off 1926 to experience. The lessons we have learned will enable us next year to do the kind of a job we had hoped to do when we tackled electric refrigeration last January.” These words from a central station executive aptly sum up the present Western attitude toward refrigeration and in a measure indicate that all was not sugar and honey during the months past, either from the standpoint of the electric utilities or from that of the manufacturers, distributors and dealers in the territory west of the Rockies. Electric refrigeration has met with the same general public acceptance in this territory that it has been accorded nationally but the only partial effectiveness of the industry's sales efforts, coupled with trials and tribulations with machines and a relatively high sales resistance attributable to a number of causes, have militated against a volume of sales comparable with that of other sections of the country.

Because of the popularity and rapidly broadening market and because of the instability of sales, servicing, financing, production and distribution practices, the editorial staffs of the McGraw-Hill electrical papers, including the Journal of Electricity, Electrical World and Electrical Merchandising, set out to make a nation-wide survey of the refrigeration situation as it exists today. More than 200 cities were visited personally by members of the staffs of these publications to obtain first-hand information from utility executives, commercial managers, sales and service men, distributors, and retail outlets. The co-operation of these men has made possible the assembly of a mass of data, facts, opinion and experience which it is hoped will help to put the development of electric refrigeration on a sound, profitable and constructive basis. The national situation is covered in the Oct. 30 issue of Electrical World. This discussion refers specifically to conditions in the eleven Western states and makes only an occasional comparison with the national situation for purposes of emphasis.

## Extent of Survey

In the Western states practically every city which is the headquarters of a central station serving 5,000 or more customers was visited, as well as a number of cities and towns on the lines of those companies. Nationally more than 25 per cent of

*IN comparison with conditions brought out in a national survey conducted by McGraw-Hill electrical papers, refrigeration development in this territory is below the average. Lack of stabilization, weaknesses in the distribution set-up and troubles with machines contributed to the failure to secure a higher volume of sales. Better selling, closer factory inspection and more careful installation will be needed if sales quota is to be reached in 1927.*

the customers of the power companies were included in the territory surveyed. In the West the percentage was considerably higher.

The most significant fact brought out in the survey was the remarkable unanimity of opinion among central-station men as to the desirability of electric refrigeration from a load and revenue standpoint. Opinions differed considerably, however, as to the desirability of central stations merchandising refrigerators, as to sales methods and policies, servicing,

distribution set-ups and the manufacturers' sales and servicing help. These differences in opinion, together with the cautious attitude displayed by the majority of power companies in California where the greatest field for refrigeration exists in the West, contributed to the poor showing which this section made in comparison to the East, South and Middle West.

A study of the refrigerators in use at the time the survey was made, Aug. 15, 1926, shows that the average saturation among domestic customers nationally was 1.78 per cent. The degree of saturation for the four geographic divisions follows:

East .....	2.00 per cent
South .....	2.41 per cent
Middle West.....	1.70 per cent
West .....	1.15 per cent

The contributing factors for the comparatively poor showing in the West will be discussed later.

Actual sales in this territory for 1926 as accurately as can be determined from the survey will approximate 15,820 domestic machines and 2,160 commercial machines. For the first seven and a half months of the year the national survey shows that total sales in the United States were in the neighborhood of 165,287 domestic units and 27,279 commercial installations. Conservative estimates of the year's total sales show that approximately 250,000 domestic and commercial units will have been sold by Jan. 1, 1927. Thus the West, with its total sales of 17,980 units, will have sold only 7.2 per cent of the total for the year. In view of the fact that 14 per cent of the total electric consumers of the country is located in this territory, the showing with respect to electric refrigeration is not particularly impressive.

### Attitude of Central-Station Executives

Every central-station executive in the Western states expressed the most vital interest in the subject of electric refrigeration. Little need exists to sell these men on the value of the load. With the exception of California, practically every power company is engaged actively in the merchandising of domestic machines. The big problem that seems to be confronting the central station is whether or not they should sell refrigeration. Some executives are inclined to the belief that they should stay out of the business so long as the distributors and dealers do a good selling job. They recognize the desirability of the load and realize that the power companies must place their stamp of approval upon refrigeration, but they prefer to do this through co-operation with existing outlets. However, all express a readiness to step into the business the moment they are convinced that the dealers are failing to secure what they consider a satisfactory volume. Their feeling is that so long as the dealers, distributors and manufacturers keep their promises to sell electric refrigeration service and not merely refrigerating machines, then a satisfactory selling job will have been done.

There are other central stations in this territory that have had experience in the merchandising of all lines of appliances that feel that they can speed up the volume of sales by going into the business themselves. Where these have studied the situation carefully and have organized adequate sales and service forces a fairly good job has been done.

A third group was swept off its feet by the possibilities of the refrigerator market. The over-enthusiasm of the members, coupled with unstable production conditions during the early part of the year, and the fact that they were not properly organized to sell and service, have resulted in troubles which have wiped the year off the map as far as refrigeration on their lines is concerned.

One of the criticisms of the central stations voiced by distributors and manufacturers' representatives has been that their over-cautiousness has retarded progress considerably. However, the executives at whom these criticisms are directed are equally sure that they are the better off for not having rushed into the business and point to several other companies that have had unfortunate experiences.

Many executives voiced the opinion that servicing costs are too high in proportion to revenue received. Very few had accurate data to substantiate this belief. Others expressed the opinion that losses incurred were to be expected in view of the fact that they were pioneering a new device.

In the Pacific Northwest executives pointed out that they could not be criticised for seeming lack of enthusiasm in pushing the business in view of the extremely low rates for service in that territory. Admitting that electric-range consumers were the best prospects on account of their familiarity with bills showing a high kw-hr. consumption and with a considerable initial outlay for appliances, these executives stated that, whereas the annual

revenue from a refrigerator in other sections of the their systems this average would run from \$6 or \$7 to \$15 or \$16 depending upon the existing saturation of ranges. Some refrigerators would be served at rates as low as 1½ cents per kw-hr. country would average between \$25 and \$35, on

### Relations with the Ice Industry

While cognizant of the spread of electrical refrigeration the ice industry is not agreed upon the effect it will have upon that business, nor upon a policy to meet the situation. Perhaps the ice man realizes that by a more aggressive sales policy, profiting by the advertising done on the general subject of refrigeration, he may be able to increase his business in a field heretofore not reached.

In two cities it is reported that the ice business actually increased this year, and it is logical to suppose that the contention of the electrical refrigeration people, that this has been due to the impetus given to refrigeration by advertising electrical machines, is true.

In two of the cities in this territory leading ice dealers have taken on a line of electrical machines, and one of these is securing more than a fair share of the mechanical refrigeration sold in that city. In several instances a bitter controversy through advertisements in the newspapers was started between a refrigeration dealer and an ice manufacturer. In each city this advertising controversy threatened to hurt both businesses. An executive of a utility company in each case acted as mediator, pointing out the dangers of the controversy and bringing about peace between the contending parties.

Throughout the territory the central station has done everything possible to protect the ice man's interests. Uniformity of viewpoint in this respect was noted in every locality served. The keynote of the general policy to be followed in relations with ice dealers was sounded at the meeting of the Commercial Section of the Northwest Electric Light and Power Association last March. Among the tenets of that policy were: that advertising should be clean and direct; that machines should be sold on their merits and not through indirect reference to the ice business in a derogatory way. These policies seem to have borne fruit.

In certain sections of California overtures of the utilities to the ice people have been fruitless. A group of ice companies still persists in running pernicious advertising in the newspapers and has gone so far as to take on a line of inferior ice boxes which it is selling to prospective customers at cost. The efforts of the electrical industry to show these men that electrical refrigeration is progress and that any advertising done in the name of refrigeration will be beneficial to both sides have been or no avail. On the whole, the electrical industry is most desirous of preserving harmonious relations with the ice men.

### Refrigeration Sales Outlets

The greatest success from the sale of refrigerators in this territory has been enjoyed by the dis-



tributor-dealers, that is, distributors which might also be termed factory branches maintaining extensive retail selling organizations. Approximately 50 per cent of the domestic units sold have been distributed through such channels. Central stations and specialty dealers selling refrigerators alone, or along with some allied line such as ranges, water heaters or oil burners, have each sold approximately 20 per cent of the total, and the remaining 10 per cent has been sold by the electrical contractor-dealers, a few department and furniture stores and one or two miscellaneous dealers.

The national survey shows that 40 per cent of the domestic units was sold by distributor-dealers; 32 per cent by central stations; 16.7 per cent by specialty dealers and 11.3 per cent by contractor-dealers, furniture stores, department stores, etc. The major proportion of the commercial units has been sold by distributor-dealers and specialty stores. Specialization is one of the requisites for the sale of commercial refrigeration. Unless the dealer or the central station has specially trained men in commercial refrigeration, neither has had much success in this field. Several central stations, however, have had their power salesmen co-operate successfully with the commercial refrigeration salesmen of the distributor-dealers.

### Sales Methods Used

One of the greatest weaknesses in this territory has been the ineffectiveness of the sales organization set-up. Competent salesmen have been scarce and difficulty has been experienced in training the few good men available. Distributor-dealers have been the most successful in this respect as they have been able to conduct special training schools with factory men as instructors. Central stations in the territory merchandising refrigerators realize that in the majority of cases specially trained salesmen must be used and that they cannot depend upon the general sales force to bring them a high volume of business. It has been found that one or two weeks of intensive training are absolutely essential for salesmen and that it takes from one to three months selling experience in the field before a man actually begins to show results.

House-to-house canvassing has been found to be the most successful way to secure prospects. Canvassers or junior salesmen have been used for this purpose and the prospects uncovered have been turned over to the regular salesmen to follow up. The free trial method has been tried by a number of companies with more or less success, but it is generally admitted that this policy should be avoided wherever possible. Continuous sales effort rather than seasonal or campaign selling was found to be the best policy to pursue.

### Compensation of Salesmen

It is generally recognized that a higher type of salesman than the average is necessary for the specialized job of selling electric refrigerators. To secure such men a better scale of remuneration must be offered than for the average type of sales-

man employed by the utilities. Methods of payment vary widely. Straight salary; salary plus commission, and straight commissions may be paid. Irrespective of the method of payment used, it should be possible for a refrigerator salesman to earn from \$250 to \$500 a month and even more during the more active part of the year. Where salary and commissions have been paid, the general policy seems to be to give the salesman \$100 monthly plus 5 per cent of the installed price. Some dealers pay a straight 15 per cent on the factory list; others, a straight 10 per cent on the installed price. A successful method employed by one power company has been to give the salesman \$175 a month and \$25 additional for each machine over five sold during the month and an additional sum of \$10 per machine sold for cash or \$5 for a 12-months' contract.

### Terms Quoted to Users

The most popular method of quoting terms to users employed in this territory is to add freight, cost of handling, installation, and carrying charge to the factory list. This price then is quoted to the customer with the statement that the reduction for cash will be 10 per cent. This is the sales plan successfully used for the majority of electric ranges sold in this territory.

Remarkable as it seems, the majority of sales made this year has been for cash, indicating that the type of prospects reached so far has been people of considerable means.

The problem of time payments is becoming more important. A variety of methods is being used. Usually a down payment of from 10 to 20 per cent of the installed price is required and the balance is spread in equal payments over a period ranging from 12 to 24 months. The most popular terms are 12 or 18 months and there is considerable tendency to keep away from the 24-month payments wherever possible. Most dealers declare that it is desirable to secure a sufficiently large enough down payment to pay the cost of installation and the salesman's commission.

The majority of machines is sold under guarantee of one year with free service for a like period. This is particularly true of central stations. Distributors and dealers, however, are displaying a tendency to cut the free service period to six months and in some instances to as low as 90 days. Defective parts will be furnished for a year but a charge will be made for labor after the expiration of the free service period. Central stations have given more liberal service than have most other dealers and they have also been criticised for this practice. Seemingly it would be desirable to develop a satisfactory service policy which would fit all classes of dealers and distributors. In this territory, where a large number of electric ranges has been sold, there is a tendency for the power company to follow the same servicing plan on refrigerators as has been employed for ranges. Under such a plan no charge is made for labor and material for the first year and at the close of that time the consumer is merely charged for material used.

### Servicing Experience

In this territory the survey shows conclusively that service costs have been too high. In most instances the cost of service has been out of line with revenue. In some cases the first year's servicing approximated two-thirds of the first year's revenue. Servicing experiences range from highly satisfactory conditions to such serious conditions that power companies and dealers have given up selling of machines for the year. Difficulties have not been confined to one make of refrigerator, as types which have given considerable trouble in one locality have been perfectly satisfactory in another and vice versa.

The survey brought out the fact that there is a serious lack of data as to servicing costs. Only in one or two instances were exact figures available. It is imperative for power companies, distributors and dealers to inaugurate means of recording the cost, nature and frequency of every service call. Naturally highest servicing costs were reported by those power companies and dealers who were the least well fitted to sell and install properly. Among the distributor-dealers who had been in the business two or three years, servicing costs as low as \$2.34 a month for a year were reported. Naturally as the number of machines in use in a given locality increases, the service cost per unit will decrease. The opinion was expressed by some men in the refrigerator industry that servicing costs should not exceed \$5 per machine per year and that costs as low as \$2.50 to \$3 per machine per year could be attained.

Among the policies pursued by some companies to eliminate high service costs has been that of having the machines inspected two or three times during the first month's operation and then approximately every three months thereafter. This has served to cut down the number of service calls.

Complaints were many and varied. Among those occurring most frequently were leaks, float valves, odor, thermostat, expansion valves, belt adjustment and general regulation, poor factory inspection, temperature control and noise. Poor factory inspection and hasty or careless installation were considered to be contributing factors in the majority of service difficulties. It was stated repeatedly that 90 or 95 per cent of the troubles could be attributed directly to one or both of these causes rather than to poor design or bad mechanical construction.

A more complete training of the installation and service men; rigid inspection and testing of units before they leave the factory, proper packing of the units for shipment and scrupulous care in making the installation will bring about a solution to the servicing problem. It was to the credit of the manufacturers that where their product gave trouble and where the difficulty was due to poor workmanship or lack of inspection they wholeheartedly accepted their responsibility.

One of the reasons for the comparatively poor showing in this territory has been the lack of proper distribution set-up. Many manufacturers

entered this field late and their efforts to bring about satisfactory dealer distribution were not successful. As competition for outlets became keen, there was a tendency to tie up with dealers who had neither the organization nor the facilities to sell electric refrigeration. With the exception of the larger dealers, few knew much about the refrigeration business and none could tell where he stood as to sales and servicing costs and profits and loss.

### Relations Between Manufacturers, Distributors and Dealers

There seems to be a tendency in this territory to follow the distributor-dealer or factory branch method of distribution. This method has been used most successfully in those sections where the power companies have not merchandised.

Dealers interviewed were practically unanimous in the feeling that the margin was not sufficient to enable them to put the intensive sales effort behind the business necessary to give profit-making volume and at the same time to cover the installation and servicing expenses. It was generally agreed that a minimum of 40 per cent is required and 45 per cent would be even more desirable. Distributors who had the widest experience held that a complete line of electrical refrigeration equipment, including all types of domestic and commercial machines, constituted a business in itself sufficiently large to require a specialty house to handle it.

One electrical contractor who specializes in residential wiring found that he was able to do a fair volume of refrigerator business by attempting to sell refrigeration to every home-owner whose house he wired. Another contractor-dealer was interviewed who had devoted so much time to refrigeration that the balance of his business was suffering. A third was found who intended gradually to eliminate other departments of his business as rapidly as his refrigerator sales increased.

In those cases where the central station was pursuing a fair and ethical policy in merchandising refrigerators, there was no complaint on the part of dealers. Such criticism as developed had mostly to do with unfair advantage taken by the power company in the way of offering unqualified free trial and indefinite service and in intimating that certain concessions would be made, particularly in the matter of line extensions if the prospect purchased a refrigerator from the central station.

In two cities the practice of allowing architects and contractor-builders a discount resulted in a chaotic condition which completely disrupted the price situation. One well-informed man in the larger of these two cities ventured the assertion that 90 per cent of the machines sold in that territory this year had been sold at a discount. In a few instances the salesman split commissions with the purchaser to make the sale. The architect contractor-builder discount situation could probably be corrected if representative refrigerator dealers in these cities would get together and agree to abolish discounts entirely or else agree to a rigid scale of discounts to apply on quantity purchases.

A few of the most successful dealers no longer are worried over the problem of selling and servicing, but are vitally concerned over the question of profit. In short, their problem is to find out where they stand and to cut sales and service costs to a minimum so that a profit may be earned.

### Sales Resistance

As indicated in the national survey the question of price and the feeling on the part of the general public that machines will be cheaper and better next year, have constituted the major sales resistances in this territory.

In northern California and in the Pacific Northwest, particularly in those cities on or near the sea, the mild summer temperatures have proved a considerable factor in keeping sales below expectations. The public in these localities has not been sold on the refrigeration idea as indicated by the consumption of ice. In this respect it is interesting to recall the results of two surveys in this territory in which it was found that less than 35 per cent of the residents in these two communities used ice any part of the year and only 12 per cent used ice during the winter months. Thus it would seem in these districts that before any volume of domestic electric refrigeration can be sold, a very material sales resistance must be broken down through education, advertising and other promotional methods. The public must be taught the value of and the need for refrigeration in the home irrespective of climatic conditions.

In rural sections where it might be expected there would be a considerable market for electrical refrigeration, particularly since the majority of the farms have electric service, it was found that sales resistance was sometimes high. The statement was frequently made that "farmers do not need refrigeration." On the smaller farms, such as are found in certain sections of Oregon, Washington and California, where milk is used as produced, where poultry is killed as needed and vegetables kept fresh in the ground, it was found very difficult to persuade the farmer that he needs refrigeration, particularly at an outlay of \$300 or more. In the rural districts where farms were larger and more prosperous, particularly in central and southern California, distributors found a ready market.

While men in the industry generally state that the so-called remote unit is the most desirable, it was found that the sales resistance on this type was considerably higher, due to the additional expense of installing the unit in the basement. It was found that a self-contained unit was easier to sell, particularly to people who rent their homes. It was also found that by far the greater proportion of ice boxes in use in the homes was not sufficiently efficient to allow for the installation of a remote unit. In many cases it was necessary to sell a new ice-box along with the unit.

In certain sections of the Western states where summer temperatures reach a point as high as 115 deg. F., it was found that the average compressor unit did not have sufficient capacity to keep the

temperature of the box below the refrigeration point. Dealers stated that it seemed likely that manufacturers would have to develop a special unit for districts of this character.

### Market Possibilities

Despite the trials and tribulations of 1926, dealers and distributors are exceptionally optimistic regarding the prospects for next year. Invariably sales quotas double or treble those of the current year were reported. The majority was confident that the experience gained during the current year would enable them to dispose of those quotas. Conceivably certain sections of this territory constitute some of the finest markets for electrical refrigeration in the country. Central and southern California, Arizona, New Mexico, Utah and Colorado are states where refrigeration is absolutely essential, particularly during the summer months. In California alone it is estimated there are 800,000 domestic consumers residing in localities where some type of refrigeration should be in the home. The remaining 400,000 domestic consumers in California reside in localities where considerable educational work will have to be done before there will be any prospect for large volume of business. The same holds true of the western portions of Oregon and Washington. The eastern portions of these states, as well as Idaho and Montana offer fair prospects.

Opinions as to the possible number of prospects among the utilities' customers varied from 10 to 30 per cent of the total number of domestic consumers.

On the basis of 1927 quotas, as reported by the central stations, dealers and distributors interviewed, it seems likely that there will be 40,000 domestic units sold in the eleven Western states during the coming year. The number of commercial units sold will, in all probability, exceed 5,000. The best estimate of the sales possibilities was offered by a central station executive who estimated that at the end of a 3-year period 10 per cent of his domestic consumers would be refrigerator users; one per cent of his customers had been sold during 1926. He believed that 3 per cent would be users at the end of 1927; 6 per cent at the end of 1928; 10 per cent at the end of 1929. He based this prediction upon the premise that the machines would continue to be of a high standard and that there would be price reductions corresponding to the increased volume of sales which the industry anticipates.

### Conclusions Drawn from Survey

By summarizing conditions and trends as brought out in the survey and considering the opinions expressed by the men interviewed it is possible to set down a number of conclusions from which the industry should be able to profit.

1. From the standpoint of the manufacturer, there seems to have been a race of supremacy during the year on the part of several of the largest producers that has not helped the general situation.

High pressure production and lack of proper factory inspection have resulted in a product which caused dealer and consumer dissatisfaction, and have contributed to high service costs. Manufacturers had a tendency to lay down sales programs inconsistent with the ability of their factories to produce units. There was a feeling in consequence that their product suffered. Simplification of mechanical design and standardization as to models are two problems which the manufacturer must face. If next year is to come up to present expectations, the trade expects the manufacturer to turn out a product that is mechanically correct and properly inspected.

2. Dealers and distributors can well afford to study their sales and service problems. Accurate data on the cost of doing business so that dealers can learn where they stand with reference to profits and losses are highly essential. Dealers must recognize that handling electric refrigeration is a new and highly specialized business and one which requires considerable capital. Even with a 40 per cent margin the most aggressive sales tactics will have to be pursued and every advantage taken of the manufacturers' sales and service helps.

3. For those central stations not definitely committed to a merchandising program a policy of complete co-operation with existing refrigerator outlets should be pursued. This co-operation rightly can take the form of talking, preaching and recommending electric refrigeration to consumers. It should include advertising and the practice of allowing distributors and dealers courtesy displays in district offices and show rooms. It might even be possible to arrange with distributors to pay a commission on prospects turned in by employees.

4. Based upon the experience of those central stations that actively sold refrigeration during the year and upon criticisms advanced by dealers and distributors, a sound refrigeration merchandising policy for the central station to pursue would seem to be as follows:

A. The central station must recognize at the outset that the most rapid and effective way to build refrigeration load is to foster and encourage all possible agencies and outlets in the sale of this appliance. To this end the utility should conduct its refrigeration business on a legitimate profit-making basis, and its sales and servicing policies should be such that the dealer will have an opportunity to compete on an equal basis.

B. In selling this appliance new sales methods and salesmen of a type higher than the average are required. Best results can probably be achieved where a special refrigeration department is organized in the sales department. Men qualified to sell refrigeration cannot be secured for the scale of remuneration paid ordinary appliance salesmen. Irrespective of the method of payment used it was the consensus of opinion that salesmen should be allowed to earn from \$250 to \$500 per month. Salesmen should not be allowed to take unfair advantage of the central station's favorable position with its customers to the ex-

tent of holding out special inducements that the dealer cannot offer. Salesmen, either for dealers or central station, require special training for a period of one or two weeks, preferably in a manufacturer's school.

C. The central station's servicing policy should conform to that of the dealers and distributors in its territory. Indefinite free service as an inducement to purchase works a hardship on the dealers and also burdens the central station with an unnecessary and unjustifiable expense. Service men should receive thorough training, either for two or three weeks and should then be sent out with trained service men for one to three months.

D. All of the ordinary methods of securing prospects can be used. Here in the West where considerable progress has been made in the sale of electric ranges, central stations find that range customers are preferred prospects as they are already accustomed to high monthly kilowatt-hour consumption and to a relatively high capital investment in electrical appliances.

E. Unqualified free trial seems both unnecessary and inadvisable. It works a hardship on dealers and constitutes weak selling.

F. Commercial refrigeration presents a highly specialized field. Because of its complexity refrigeration sales engineers are necessary. Where the central station cannot secure such a man satisfactory results have been obtained by having power salesmen co-operate to the fullest extent with the commercial refrigeration salesmen of the distributor-dealers.

G. If machines are set up and thoroughly tested before delivery to a customer and delivered cold less servicing is required.

H. It is wise to inform thoroughly a customer concerning the operation of a machine at the time of its installation. It is also good policy to have the machine inspected two or three times during the first month and then quarterly or semi-annually thereafter.

I. Because there has been an almost universal laxity in keeping figures on the cost of selling, the recommendation was frequently made that data on handling, warehousing, advertising, servicing and other elements entering into the sale's cost be carefully kept.

5. The year 1926 has seen electric refrigeration pass through many of the difficulties of any new business, particularly with reference to production and selling. The problem in the West has been one of sales and servicing. The former is a job for the central station, distributors and dealers. The latter has been partly due to the manufacturers and partly due to improper installation. The situation is not altogether discouraging and the solution is already in sight for many of the problems discussed. At any rate, the experience gained during the months just passed promises to bear fruit in 1927 in direct proportion to the extent to which the industry profits by the lessons learned.



# Electricity Co-operates with Oil

By Roy Willmarth Kelly

Manager, Industrial Relations, Associated Oil Company

**D**URING the past five years, much attention has been given by leading Western oil companies to cutting costs in oil production. One of the largest California companies reports a gain of nearly 300 per cent in the amount of oil produced per man during 1925 in comparison with the year 1921. This company increased its crude oil production from 792,522 barrels in January, 1921, to 1,431,228 barrels in December, 1925. During the same period, the field working force was decreased from 1,914 to 1,418 men. This means an increase from 414 barrels per man on the payroll to a production of over 1,009 barrels for each man employed.

Part of this increase can be ascribed to the fact that the newer fields in California produce many more barrels of oil per well than was true of the fields which were yielding the major part of the state's crude oil production in 1921. Nevertheless, this company states that it has the statistics available to prove that, even in the older well-established fields, both the cost of production and the number of hours of labor required to produce a barrel of oil have been greatly reduced.

Very striking reductions were effected in the number of men needed to operate the older fields by studying the question of transportation for employees who are known as "oilers" or "pumpers." These men go about from well to well and from jack-plant to jack-plant, watching the oil lines and the machinery, making any minor repairs that may be necessary, and caring for the oil as it is pumped. For many years, it was customary in the oil fields for these men to walk about from place to place. Where the wells were located some distance apart, a pumper could manage only a few wells. An experiment was tried in a few fields by providing these men with small light cars. It was found that sufficient saving could be effected to return the purchase price of the car in six months' time. The working force in this particular occupation was cut down from three-fourths to one-half, depending upon the character of the country and the roads over which the men traveled.

Even greater cost reductions have been made by applying electricity as a source of power for pumping. A survey recently made in four oil fields in Kern County, Calif., shows the total connected elec-

*AS crude oil has become more valuable, and as markets have been developed for gas produced in oil fields, it is no longer economical to operate boiler plants and maintain steam lines for oil field power. The electric motor has proved its case by gains in convenience and safety, as well as by decided savings in cost of operation. These considerations as well as the co-operative attitude of the oil industry towards the electrical industry are told in this article by an oil man.*

tric load to be approximately 12,000 hp. Of this load, 10,350 hp. is in pumping motors, 750 hp. in drill motors, 750 hp. in line pumps, and 1,050 hp. in machine shops, garages and ice plants, operated by the various oil companies. The average monthly consumption of these motors approximates 2,000,000 kw-hr.

This marked turn toward electric power in oil field operation is in strong contrast to what was seen in the oil fields ten years ago, when steam was everywhere the common source of power.

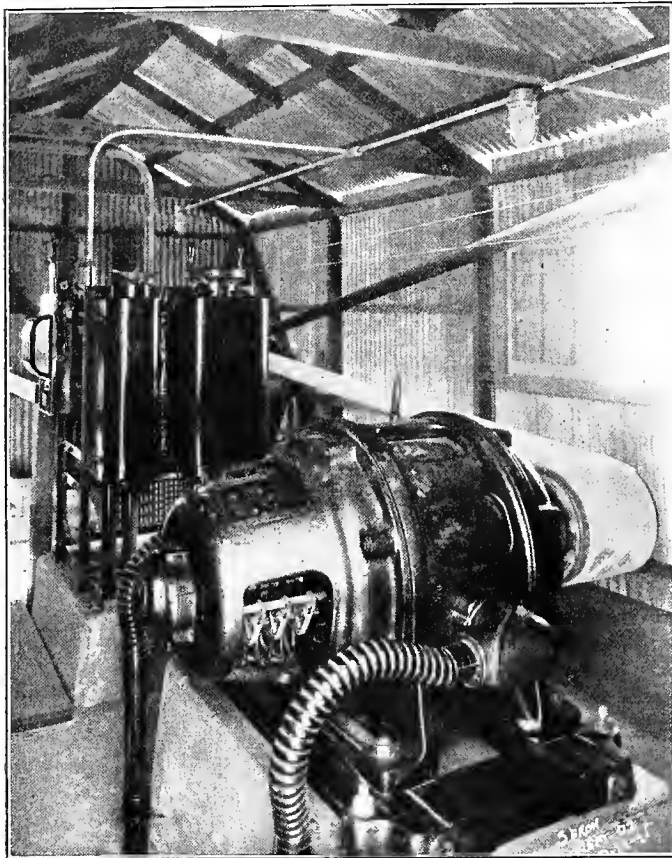
As crude oil became more valuable, and as markets were discovered for the gas produced in these fields, by pipe lines connected with Los Angeles and other cities, it was no longer economical to operate boiler plants and maintain steam lines. The motor has proved its case by gains in convenience and safety, as well as by showing decided savings in cost of operation over other methods for pumping wells. Reports on 203 wells recently gathered from various companies show an average cost of 4¼ cents per barrel for electric power. The cost per well per day averaged \$1.42, with an average consumption of 3.3 kw-hr. per barrel of oil produced. The 203 wells in question were averaging 204,150 barrels per month.

In addition to individual motors operating the pump at a single well, motors are being extensively used for operating jack plants which are connected to a considerable number of wells. Data collected from various companies show that jack plants can be operated with a cost as low as 35 cents per well per day for electric power. The cost for operating the same type of jack plants on gas engines runs from \$1.25 per day up. Steam costs may be as high as \$6 per day per well.

Reports from companies keeping records of steam in comparison with electricity over a period of years show especially marked savings where bad water conditions prevail. At McKittrick, in Kern County, records kept over a period of years show that where steam is used for pumping, the cost per well for all the items connected with maintenance and operation of boiler plants, steam lines and steam engines, varies from \$5 to over \$7 per day. Similar costs for wells pumped with gas engines vary from \$2 to \$2.50 per day. It has been clearly demonstrated that motor-driven equipment can be operated

at a cost considerably lower than \$2 per well per day.

In southern California, the oil fields are rapidly becoming netted with power lines. It is only a matter of time until nearly all the oil pumping in



Interior of motor house, McKittrick, Calif. Floors and piers for the motors are of concrete. Guards were removed while this picture was taken.

the well-established fields will be done by electricity. Companies interested in this development report that much of the saving incidental to electric power is brought about by being able to keep the wells pumping constantly. Repairs are fewer, accidents are infrequent, and less labor is required to supervise the wells.

In the Sunset-Midway fields in California, considerable quantities of gas are being utilized by the hydroelectric power companies to increase the voltage of their power lines which pass through this district.

There has been at times a certain amount of hesitation on the part of oil operators to advocate the use of electricity, due largely to the fear that electricity might eventually have a bad effect upon the fuel oil market by supplanting oil as a source of power. This fear is almost groundless, as experience has shown that oil and electricity each has its own field of service. Each supplements the other, and, under right conditions, hydroelectric power and oil production make progress side by side.

In 1924 the electric utilities of California used over 10,000,000 barrels of oil, owing to dry year conditions as against 3,000,000 barrels in 1923, a

year of normal rainfall. This use of 7,000,000 barrels in excess of customary requirements should remind everyone that all our public utilities are closely dependent upon the petroleum industry. Lubricants and fuel for power purposes, as well as for extensive fleets of motor-driven vehicles are, under present conditions, essential to the continued operation of our telephone lines, our hydroelectric power companies, our transportation systems, and the plants supplying us with water, gas and light. Although there is no definite understanding or arrangement covering the situation, it is taken for granted that the petroleum industry holds itself ready at all times to meet the emergency requirements of the public utilities, even to the extent that other users are requested to restrict their customary use of oil. No one knows when circumstances even more urgent than a dry year may arise. Fire, storms, landslides, any one of many causes may appear, to increase the dependence of



A complete rig and motor house at McKittrick, Calif., showing the method used to balance rods and fluid. The motor drives the pump by means of the rod projecting from the motor house to be seen at center of the photograph.

electric power plants upon oil much beyond their usual daily consumption.

The interdependence of these two great basic industries is perhaps not generally clear. These problems ought to provide food for thought on the part of everyone who studies the current recommendations being proposed by legislators and others for regulating our public utilities, as well as our petroleum resources.

## Colorado Utility Encourages Visitors to Plant by Special Effort

NOT only is the Public Service Company of Colorado willing for the public to view its new steam generating plant at Valmont, but it is actually spending money and energy to interest people of the state in making the trip there and viewing the source of their electrical energy at first hand.

The department of public relations, under the guidance of Rufus G. Gentry, and assisted by the engineering and the publicity departments, is carrying out a program through which it is hoped eventually to acquaint a fair share of the population of Colorado with the technical features of the \$6,000,000 plant.

### A Journey through the Valmont Plant of the PUBLIC SERVICE COMPANY OF COLORADO

An attractive booklet bearing this inscription serves as a guide and a souvenir to those who visit the Valmont plant of the Public Service Company of Colorado.

As fast as is practicable, various groups in Denver, Boulder and other nearby cities are being conducted through the plant by company guides who explain the essential features and answer all questions advanced.

Within the last few months over 2,000 persons have been piloted through the station in these groups. The Rotary, Lions, Optimist, and Advertising clubs of Denver, members of the Allied Building Trades Council of that city, officials from various municipal departments and several other industrial and civic bodies are included in the list of visitors to date.

To make it more feasible for such groups to view the plant, there have been fitted out a kitchen and dining room on one of the upper floors of the boiler room. The facilities are thus at hand for dinner and luncheon meetings, making it possible for organizations to combine their regular gatherings with their inspection of the station.

All kitchen equipment is electrically operated, making an additional feature of interest in connection with the visit. The assembly room can accommodate 250 persons and cafeteria style chairs make it possible to feed that number at one time.

To facilitate the tour of inspection, arrows and signs have been installed throughout the plant. Visitors are taken first to the fifth floor of the plant in an automatic elevator. Stepping out of the lift, they find arrows directing their progress throughout the building. Every piece of equipment bears a sign explaining in language intelligible to the average layman just what its function is and what its relation is to the plant as a whole.

Thus, while guides are furnished for all parties of any size, it is possible for the casual visitor to make his way through the plant alone, viewing its various parts in the most desirable order and becoming educated as he goes.

As a further aid, an attractive 16-page booklet has been prepared by E. K. Hartzell of the Boulder publicity and advertising department entitled, "A journey through the Valmont plant of the Public Service Company of Colorado."

This is in essence a guide book. It is replete with interesting facts and pictures in connection with the plant. The description is given in the same order of sequence as visitors are conducted through the station. In addition, it gives general information concerning the dissemination of the electrical energy generated there and is calculated to comprise a composite picture of the producing and distributing departments of the company.

The booklet is attractive in make-up and of high class workmanship throughout. It thus is enough of a literary effort and compendium of information to make it desirable as a souvenir. Copies of the booklet are available free of charge at various offices all over the system and they have been the means of inducing many to visit the plant.

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#### Coal Pulverizing Plant

COAL is lifted from the outside bins and railway cars by a big clam-shell bucket capable of bringing up 150 tons an hour at the rate of 2½ tons each time. The round trip of this bucket from the top of the pulverizing plant to the bins or cars beneath requires less than two minutes.

A magnetic separator belt at the top of the pulverizing plant catches the coal as it is discharged from the bucket, and as the belt conveys the natural fuel to the bunker, particles of iron, bits of steel and other foreign substances subject to magnetic attraction are caught on the belt and carried away. This prevents injury to the grinding mills.

Beneath the top bunker are the crushers, where the first operation in pulverizing the coal is completed. Later it passes into four huge grinders, where heavy mills, each driven by a 100-horsepower motor, grind the fuel so fine that 85 percent of it will pass through a 200-mesh screen. These grinders have a capacity of a tons of coal per hour.

The powdered fuel then continues its journey past the exhausters which lift it from the mills and blow it to the separators. From these it is directed into the screw conveyors and to the boilers. Coal is dried at Valmont by the utilization of hot gases taken from the stack after coming from the boilers.



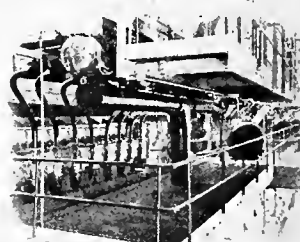
DO YOU KNOW THAT  
Operation of the turbine at full  
capacity requires about 400 tons of  
coal per day.

#### Why Not Water Power

THE management of the Public Service Company of Colorado is frequently asked why it does not use hydro energy in the manufacture of electricity. This is a very natural and proper inquiry, and many answers might be given thereto. First, all hydro plant sites within a radius of 150 miles of Denver were investigated before the Valmont plant was built. None were found that permitted the Company to develop power as cheaply as the steam plant.

Colorado mountain streams are seen by the majority of people in the summer time during the flood years. But strange the remainder of the year when few people see them and when there is no snow on the high mountains, or when snow is falling in freezing temperatures, there is but little water to be found flowing in the streams.

People use more electricity in the winter than in the summer because the evenings are longer. The farmers of Colorado long ago appropriated all the summer water-ways for irrigation and will not permit the power companies to store their water. This is quite proper as the life and welfare of the cultivated irrigated section is the chief support of Colorado's population and must therefore come first.



DO YOU KNOW THAT—  
The generator at Valmont is air-cooled. Every minute 80,000 cubic feet of air circulate through the generator. This air, in turn, is used to eliminate dust and other foreign particles.

Inside the booklet given to visitors at the Valmont plant of the Public Service Company of Colorado information relative to the various features of the plant is given. Historic data concerning the plant and reasons for steam rather than water power are included among details of the machinery and its uses.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Speeding Operations on Big Transmission System Localization of Routine Dispatching Relieves Central Office and Facilitates Service Continuity

By H. W. NEIR, Dispatching Supervisor, Southern California Edison Company, Los Angeles

System expansion and load growth on the system of the Southern California Edison Company threw too great and diverse burdens upon the one cen-

tral dispatching office and its crew of 8 men. Accordingly in the fall of 1923 the work formerly concentrated in the main office was divided and assigned to two additional sub-dispatching offices. Further to relieve the increasing routine of the dispatching organization 12 strategically located substations were picked out and designated as "switching centers." Each of these controlling points was selected after careful consideration of its position in the transmission and distribution system and of its telephone connections and facilities. Their positions on the system are shown in Fig. 1.

### Switching Centers

Lines of all voltages under 30 kv. are handled by the various switching centers, thus greatly reducing the routine work of the dispatching organization. The men at these centers are intimately familiar with all of the lines in their districts and are in a position to handle more expeditiously the switching incident either to trouble or to construction or repair work. The men at the switching centers are under the substation department but subject to the supervision of the dispatchers in all matters pertaining to switching. In matters of parallels between transmission stations or in load shifts the

operators at the switching centers work directly in conjunction with and under the direction of the dispatching office covering the particular territory in question.

The decentralization of authority has resulted in an average reduction in time of interruption of at least 50 per cent, as far as the distribution system is concerned. Further it has resulted in betterment of the operating personnel and in better handling of load and transmission problems by the dispatchers.

### Sub-Dispatching Offices

The division of the direct dispatching responsibility among three offices required the development of that organization as shown in Fig. 2. Under the present scheme there are 10 men at the central office and 4 each at Vestal and at Colton, the sub-offices. The divisional dispatching offices handle all of the load and transmission problems of their districts and work in conjunction with the central office in major system operations. Here again the decentralization of authority has resulted in greatly speeding up operation in connection with system troubles, normal routine and in construction or repair work and also reacted favorably in personnel quality.

Aside from their activities in handling the system, these divisional dispatching offices take the reports of and direct the work of patrolmen in emergency work and gather the reports and operating data on the various plants and stations under their jurisdiction, forwarding composite reports to the central office for the system reports kept up there.

The sub-dispatching offices at Vestal and at Colton are installed in buildings separate from the substation buildings themselves. These buildings contain the office, telephone terminal and test room and all necessary equipment. The office in each case is about 20x20 ft. and contains the desk with its telephone switchboard, system diagram board, necessary indicating instruments and usual office equipment. In addition, there is installed an annunciator board, shown in Fig. 4 at the right of the telephone board on the operator's desk. This annunciator gives the dispatcher instant indication of the operation of any circuit breaker at that particular station. Thus he is enabled at once to proceed with whatever system operations may be necessary without taking the time to call the station operator to find out what happened. In addition, this feature leaves the operator at these important stations free to proceed with the clearing of his trouble without taking the time necessary to call the dispatcher. See Fig. 3.

The dispatcher's desks at the sub-offices are wired for 20 telephone circuits and are fitted with double-throw keys instead of cords and plugs for

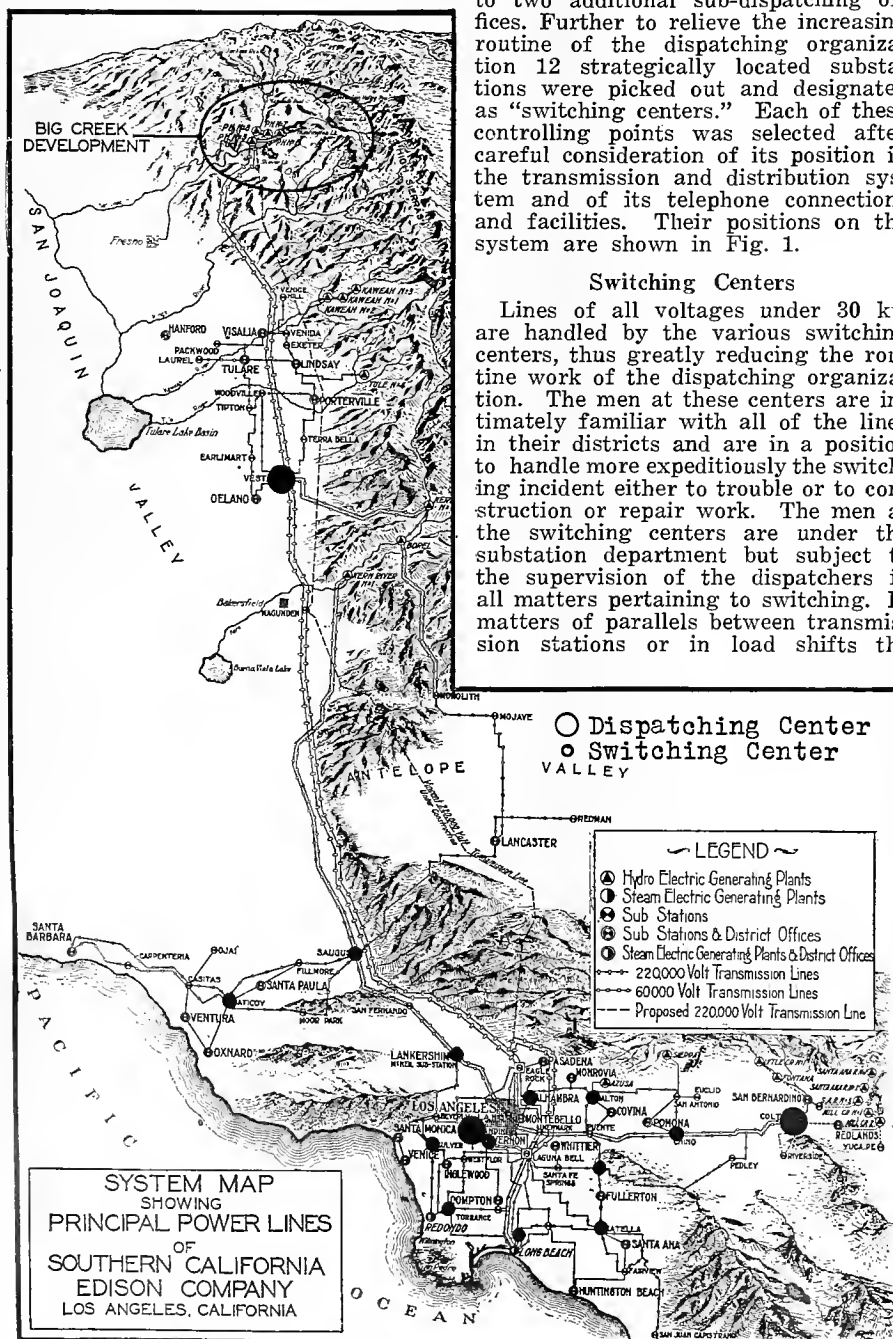


Fig. 1. Map showing relation of branch dispatching offices, switching centers and major transmission lines. Large dots indicate dispatching offices and small dots indicate switching centers.



putting up connections on special buses. This latter feature acts to speed up operation.

After a study of the company's telephone system numerous changes were

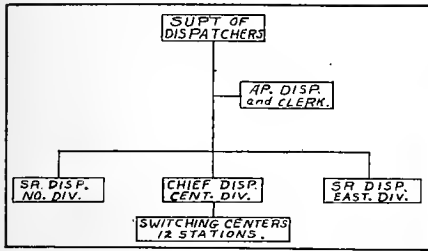


Fig. 2. Diagram of dispatching organization.

made to fit the requirements of the new dispatching system. Inter-district communication was necessary as well as ties with the other dispatching offices and with the switching centers.



Fig. 3. New sub-dispatching office at Vestal substation in the San Joaquin Valley; substation in the background.

The flexibility of the communication system was increased greatly and the traffic of the general office trunk lines materially reduced, again resulting in more expeditious operation.

In addition to the above-mentioned changes in the dispatching organization, a man was chosen from the hydro-generation department and stationed at Big Creek No. 3 to act as water dispatcher. His duties are to regulate the withdrawal of water from the various reservoirs, and the load on the various plants and the various

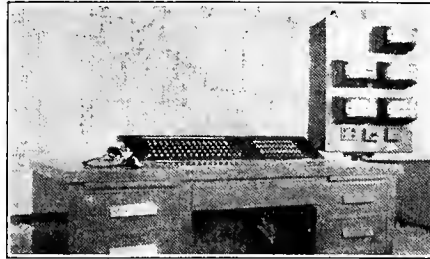


Fig. 4. Standard telephone desk used at sub-dispatching offices.

units within the plants in such a way as to increase the over-all efficiency of the system.

#### Beneficial Results

Summed up, the changes effected have resulted in several advantages:

1. Reduced the length of system outage on major troubles approximately 40 per cent.
2. Improved the over-all efficiency of both the hydro and the steam plants.
3. Materially reduced the time of routine switching of lines and apparatus.
4. Reduced the length of interruptions on district feeders approximately 50 per cent.
5. Allowed more time for the dispatchers to devote to more important load and dispatching troubles.
6. Enabled operators at switching centers better to familiarize themselves with the system by a closer contact with actual operating problems.

## Operating Data Is Obtained on Butterfly Valves

### Forces to Be Overcome in Closing a Butterfly Valve Under Free Discharge Determined by Experiments

By C. B. McAULAY, Chief Engineer, Joshua Hendy Iron Works, Sunnyvale, Calif.

Popularity of the butterfly type of valve for hydroelectric installations has increased rapidly in the last few years. With this increase there is a natural demand for better construction, less leakage past the seats and sturdier operating mechanisms. In recent installations the safety of the power house has been entrusted wholly to the ability of this type of valve to close in case of rupture to the penstock. In at least one case on record the butterfly valve justified this faith.

Some engineers specify that the valve be constructed so that it can be closed with free discharge under full reservoir head. This is a condition that in all probability never will be met with, the nearest approach within the author's knowledge being the jamming of the turbine wickets in the wide-open position necessitating the closure of the butterfly valve to shut down the unit. With the latter condition or with a rupture in the penstock there will be considerable back pressure until the valve is about half closed, from which

position to full closure spouting will occur through the valve.

A divergence of opinion exists between manufacturers as to the forces to be overcome in closing a butterfly

valve with free discharge. The Joshua Hendy Iron Works has just completed a series of tests to supplement the theoretical assumptions. Unfortunately these had to be made with a small valve, 3 3/8 in. in diameter, and with moderate water pressures.

Water was taken from an elevated tank through a centrifugal pump. Maximum static pressure developed by the latter was 105 lb. per sq.in. which dropped to about 19 lb. per sq.in. with the butterfly valve fully opened. The valve was attached at the end of a 3 1/2-in. pipe and discharged into atmosphere. A sheave of 14-in. pitch diameter was mounted on the valve spindle and buckets were suspended to a wire attached to the sheave. Thus the valve could be opened, held balanced or closed by changing the weights of the buckets, sand being used as a weight medium. The rim of the sheave was graduated and a pointer was mounted on the valve body to indicate valve openings in degrees. The valve spindle was well oiled before starting the experiment.

To ascertain the torque when not under pressure, the valve first was closed tight under static pressure and then this pressure relieved. It required 58 lb. at 1 in. to start the disc from its seat and 9 lb. at 1 in. to continue the movement. With the glands unpacked it required 1 1/4 lb. at 1 in. to move the disc.

The result of the first experiment is shown in Fig. 1. The valve shutter was a plain disc with a circular boss to receive the spindle. When closed the disc was in a plane at 40 deg. with the vertical. With the valve tightly closed and under pressure, sand was poured into the bucket on the opening side until the peak load was reached at about 50 deg. from the vertical. At any point between 50 deg. open and full closure it required an effort to move the disc in either direction, while from 50 deg. open to full open the disc would swing back to the 50-deg. point.

The second experiment is shown by Fig. 2. The disc was turned down until it seated at an angle of 5 deg. and the experiment was conducted as shown in Fig. 1.

The third experiment, shown in Fig. 3, was made with pressure applied to the opposite side of the disc to that in the first two experiments.

In the fourth experiment, Fig. 4, an attempt was made to hold the water

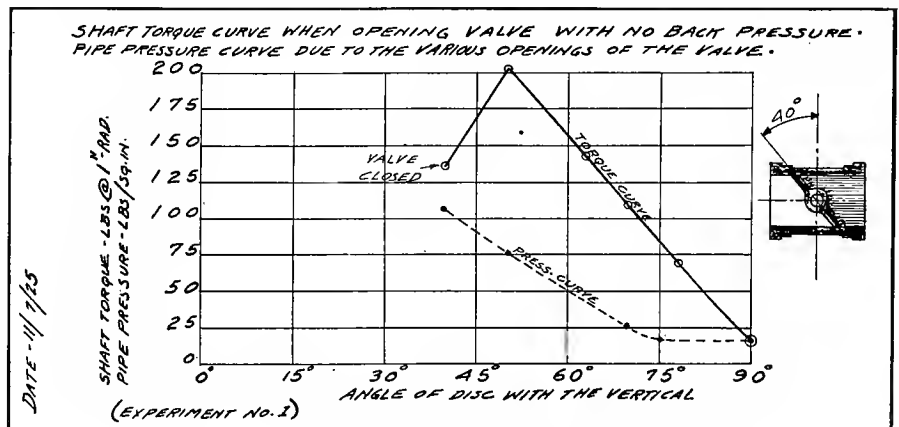


Fig. 1. Butterfly-valve tests.

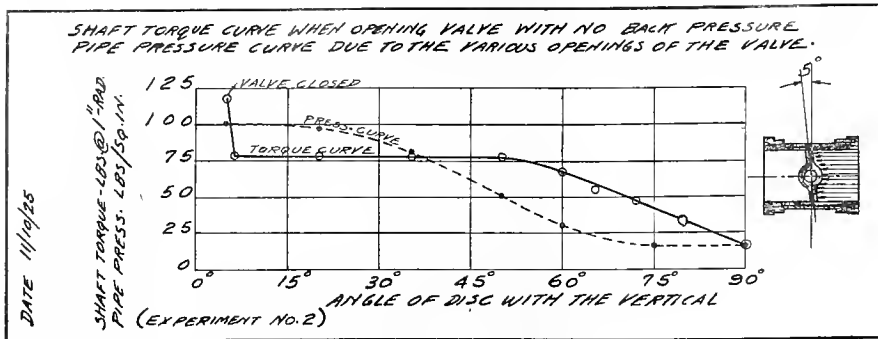


Fig. 2. Butterfly-valve tests.

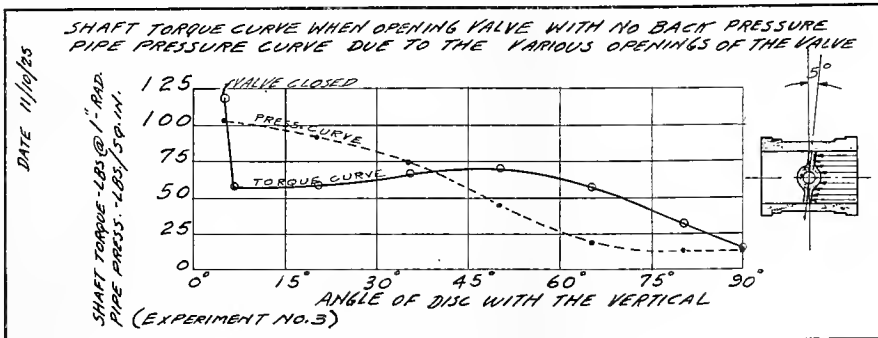


Fig. 3. Butterfly-valve tests.

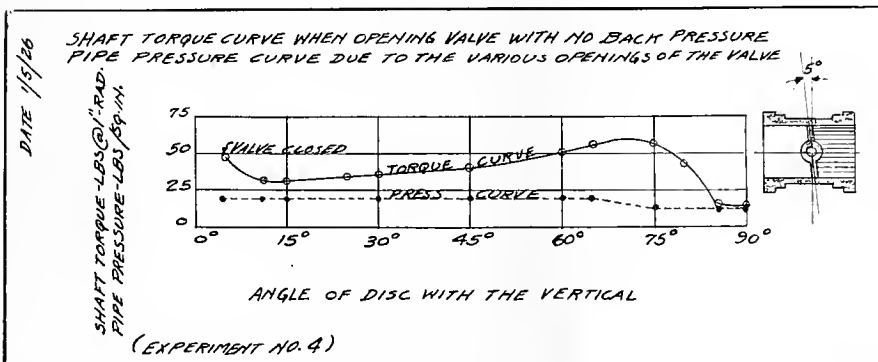


Fig. 4. Butterfly-valve tests.

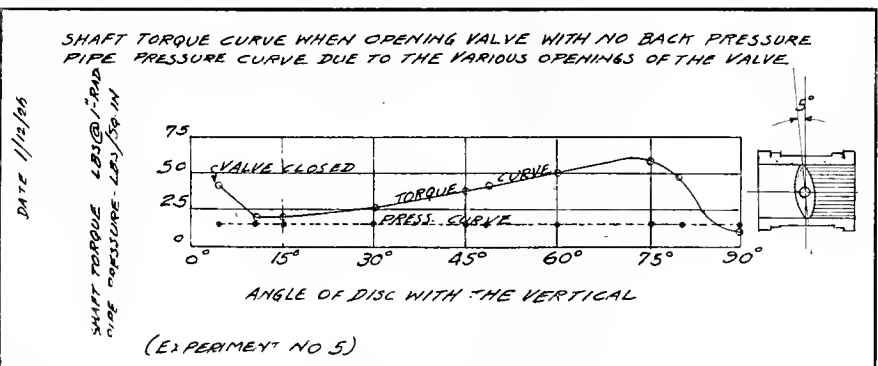


Fig. 5. Butterfly-valve tests.

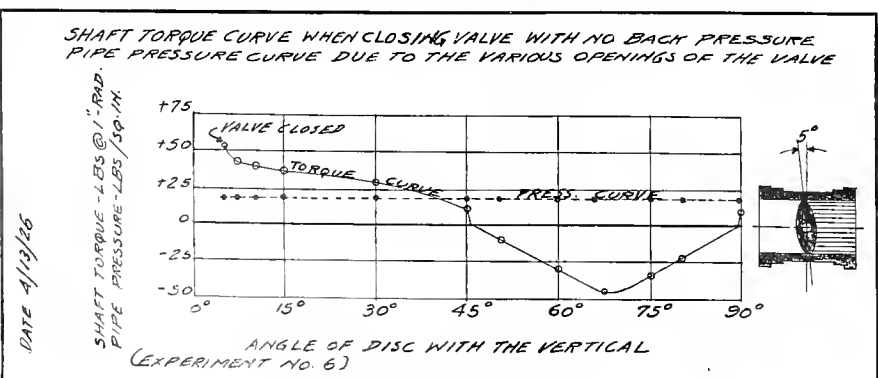


Fig. 6. Butterfly-valve tests.

pressure constant. However a slight drop-off occurred at maximum torque.

In the fifth experiment, Fig. 5, a disc with double-convex faces was used and the water pressure was kept constant throughout the stroke. It is interesting to note that the point of maximum torque was at the 75-deg. opening and not at closure and under static head.

All the preceding tests were made by starting with the valve closed tight. The sudden drop of the torque curve at the beginning was due in a great measure to jamming the disc on its seat to shut off all leakage.

The sixth experiment, Fig. 6, was made by starting with a wide-open valve and measuring the torque through the closing stroke. In the wide-open position the disc was in balance and a slight force was necessary to start the closure. However, when the disc was moved off the center position it had a tendency to close, this tendency existing in a varying degree up to the 45-deg. position. The negative forces given by the curve are those necessary just to hold the disc at any given point.

From a 45-deg. opening to full closure the friction on the spindle would hold the disc in any position. Hence the remainder of the curve was made by setting the disc at various degrees of opening and adding weight until it started to move.

From the curve, Fig. 6, it may be seen that for closure the maximum external force throughout the stroke was that necessary to jam the valve tight enough on its seat to stop leakage. This latter force would not be so great with a proper seal ring adjusted to prevent leakage, nor would the force necessary to start the disc from its seat be so great.

The calculated force for the latter case would be in in.-lb.

$P$  = Total normal pressure on disc, in lb.

$$T = P_c + P_{ur} + \frac{p u d^2}{2}$$

$$C = \frac{(R^2 \cos \phi) \times 12}{4h} = \text{Point of application of force } P, \text{ below the center line of the shaft in inches. (See Hughes and Safford on hydraulics, p. 45.)}$$

$R$  = Radius of valve in ft.

$\phi$  = Angle of disc from the vertical.

$h$  = Head in ft. on center-line of valve.

$u$  = Coefficient of friction.

$r$  = Radius of shaft in inches at journals.

$p$  = Pressure in lb. per sq. in.

$d = 2r$ .

Putting  $R = 0.1615$  ft.

$\phi = 5^\circ$ .

$\cos \phi = 0.9962$ .

$h = 39.3$ .

$u = 0.2$ .

$r = 0.4062$ .

$p = 17$  lb.

$d = 0.8125$ .

Then  $C$  is so small in this case it may be ignored.

$$T = 200 \times 0.2 \times 0.4062^2 + \frac{17 \times 0.2 \times 0.8125^2}{2} = 17.34 \text{ lb.}$$

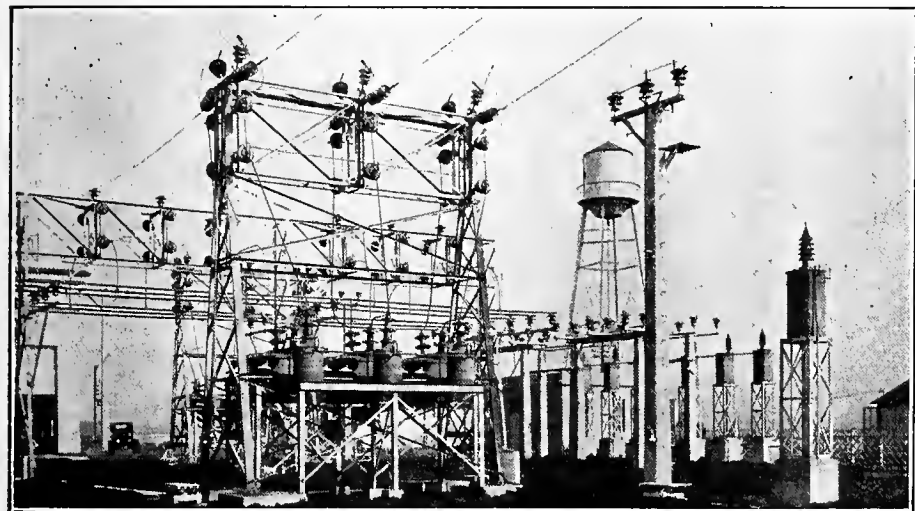
This checks very closely with Fig. 5 after the disc is started from its seat.

If these meager tests give an indication of the true forces it is safe to say that few operating mechanisms as built are strong enough to close this type of valve under free-discharge conditions. It would seem to the author that the purchaser would have to de-

termine how far he would care to go to provide for this possible emergency. The maximum acceptable leakage and the type of seal ring selected also would affect the design of the operating mechanism. Without a seal ring the valve may be jammed hard on its seat and still pass a large quantity of water, while with a properly designed and adjusted seal ring the butterfly valve is practically water-tight without jamming.

Combination Switching-Transformer Unit Saves Space

A standard 66-kv. combination switching and metering tower used at many substations of the Pacific Gas and Electric Company is shown in the accompanying illustration. The bus structure may be seen in the background with the transmission line leads coming from each bus through disconnecting switches to the tower. The line oil circuit breaker is mounted on an independent frame within the span of the tower footings. Attached to this same frame are the current transformers used to supply energy to instruments and relays. It may be noted



A standard 66-kv. line switch and instrument transformer unit used extensively by the Pacific Gas and Electric Company

that by closing the air-break switch at the top of the tower and opening the two sets of disconnecting switches the oil breaker is completely isolated and may be worked upon without any interruption to service over the line. While this is being done the bus-tie breaker serves as the automatic breaker for the line. The single potential transformer is connected to the line-side of all switches so that meters and pilot lights will give an accurate indication of the condition of the line regardless of the position of any of the switches controlling the line at the station in question. The rotary switch at the top of the concrete pole serves to isolate the potential transformer when it is necessary to do so. Normally the fabricated steel support for the potential transformer is built higher in order to give the proper ground clearance with a concrete foundation of the same height as the other foundations of the unit set-up.

Scale Removed from Cooling Coils by Heat Treatment

By LLEWELLYN EVANS, Superintendent of Electric Works, City of Tacoma, Wash.

Dislodging scale from cooling coils of transformers and removing same from the coils by means of compressed air has been found economical and effective by the city of Tacoma. The coils were heated to a red heat in annealing oven causing the scale to peel from the pipe leaving the pipe entirely clear and without pits. The only precaution necessary was that the temperature and time of treatment be so regulated that the coils not be deformed by the heat or due to softness of the pipe metal.

Cooling coils in service for 14 years in transformers in the city of Tacoma were found to be badly clogged with scale deposit. A total of 24 of these 2,000-kw. units was affected so seriously that it was necessary to devise a means of cleaning them satisfactorily or to replace them with new ones. The above method was hit upon partly at the suggestion of the Tacoma Welding Works and proved efficacious and satisfactory.

To remove the lossened scale from the coils an air hose was attached to one end of the coils and compressed air passed through the coil at a high velocity, carrying the scale out with it. The accompanying illustration shows



Blowing scale dust from cooling coils after having lossened same by heat treatment.

this stage of the process and shows also the mechanics beating the pipe coil to assist in the removal of scale and dust. To check the thoroughness of the results obtained by this method a section was sawed from one of the coils at a location picked at random to determine just what the results had been. The section cut out proved to be entirely free from scale and not damaged in any way by pitting.

Record Form Provides Promotion Data for Employees

Aiming to make possible the intelligent promotion of deserving and specially trained employees to more responsible and better paid positions when such positions occur in the organization, the Los Angeles Gas and Electric Corporation is collecting personnel data covering the complete history of all employees. These records will be compiled into usable, systematic form readily available when promotions or transfers are being considered. The form is made up of three major subdivisions, the personal data, educational history, and occupational history with the Los Angeles Gas and Electric Corporation.

Los Angeles Gas and Electric Corporation  
PERSONNEL RECORD—CONFIDENTIAL

Name \_\_\_\_\_ Address \_\_\_\_\_ Tel. No. \_\_\_\_\_  
Department \_\_\_\_\_ Immediate Superior \_\_\_\_\_  
Present Position \_\_\_\_\_  
Dates \_\_\_\_\_

PERSONAL DATA

Name	First	Initial	Birth Date	Birth Place	Married	Children	Spouse's Name	Spouse's Birth Date	Spouse's Birth Place	Spouse's Occupation
Sex	Male	Female	Age	Years in Service	Years of Experience	Years of Education	Years of Training	Years of Study	Years of Practice	Years of Teaching
Grade	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth

EDUCATION AND SPECIAL ABILITIES

Schooling \_\_\_\_\_  
Graduated \_\_\_\_\_  
High School \_\_\_\_\_  
Business School \_\_\_\_\_  
College of \_\_\_\_\_  
University of \_\_\_\_\_  
Degrees \_\_\_\_\_  
Foreign Language Ability \_\_\_\_\_  
Entertaining Ability \_\_\_\_\_  
Athletic Activities \_\_\_\_\_  
Community and Organization Activities \_\_\_\_\_  
Hobbies \_\_\_\_\_  
Activities During School Years \_\_\_\_\_  
Military Service or Training \_\_\_\_\_

Self-Improvement Efforts Since Leaving School \_\_\_\_\_  
Present Self-Improvement Efforts \_\_\_\_\_  
Ultimate Ambition \_\_\_\_\_  
Natural Aptness for What Kind of Work? \_\_\_\_\_  
Work at Which Most Skilled? \_\_\_\_\_  
Trade or Profession \_\_\_\_\_  
Member of What Organizations? (Globe, Lodge, Churches, Associations, etc.) \_\_\_\_\_  
Do You Desire to Change Your Work? \_\_\_\_\_  
Position Desired \_\_\_\_\_  
Preparation for Work Desired? \_\_\_\_\_  
Remarks \_\_\_\_\_

OCCUPATIONAL HISTORY WITH L. A. G. & E. CO.

Date	DEPARTMENT	Nature of Work	Salary
			Month
			Year
			Final

Face and reverse of employees' record form used by the Los Angeles Gas and Electric Corporation.

# IDEAS FOR THE CONTRACTOR

## Electrical Estimating for the Contractor—XVI

### Knowledge of Pumps Necessary to Lay Out Satisfactory Installations Under All Possible Conditions

By J. R. WILSON\*, Quality Electric Company, Los Angeles

The handling of liquid and semi-liquid substances by means of pumps is becoming of greater importance each year. The estimator who specializes on industrial installations or who is located in an agricultural or horticultural district will be called upon many times to recommend the proper type of pumps or to design complete pumping installations.

At least a working knowledge of pumps designed to meet efficiently particular conditions therefore should be acquired by electrical estimators. Today no argument is required on behalf of the employment of modern scientific irrigation which has become a thoroughly accepted part of agriculture. In the western states particularly, where irrigation plays such an important part in the prosperity of certain communities, the need for this knowledge will be many times apparent.

Electrical pumping has proved to be the most economical and efficient means of transporting liquids between two points, but this efficiency is dependent upon the particular pump being fitted to do the work desired. Each type of pump is designed to perform certain work under specified conditions of operation, therefore, a consideration of the limitations of each type is of paramount importance.

#### Pump Types

A great variety of pumps is used in modern industry, but as a general rule the tendency is to eliminate reciprocating pumps and to use centrifugal or rotary types. The type of pumps driven by electric motors includes acid pumps, air pumps, brine pumps, deep-well pumps, fire pumps and other high pressure types. The flexibility of electric drive and the ease with which it can be adapted to automatic control places it far ahead of any other form of pump drive.

In addition to the types just listed there are irrigation, milk and cream, house service, sewage, mine service and man-hole pumps; vacuum, dredge, sump, paper pulp, sprinkler and other pumps, all driven by means of electric motors. The field is so large and the existing applications so numerous that it seems safe to say there is a type of pump suitable to meet every possible pump problem. The same statement applies to available forms of automatic-control equipment, of which there is an innumerable number of forms upon the market designed to operate under specified conditions. We have float and pressure switches for liquids, gases and air, contact-making

gages and thermometers controlled by temperature, and other forms to meet any existing condition.

There are two general classes of centrifugal pumps: volute and turbine.

#### Quality or Price?

Old stuff, maybe, but just the other day a big department store job in a large city went to a cut-price contractor when it might have gone to a high-grade contractor and paid him a legitimate profit.

"I was pretty willing to pay the difference between the two bids," said the building owner, "if I had had any assurance that I was going to get a better job. But when both contractors talked nothing but price, and neither sold me quality, what was I to decide by? When it came down to a pure and simple price consideration, I had to assume an equal quality and there was nothing to do but take the lower price."

Always there will be someone willing to cut price. No amount of effort is going to prevent it. But there's no limit to quality. That is something too few people deal in. Quality is seldom sold—even the contractor who buys his own socks, suits, and automobiles on quality—wouldn't think of buying a cheap car because it is cheaper—he wants the best there is.

Give your customer credit for wanting the best. He will be glad to feel that you think he is that kind of man. Sell your jobs on quality and you can sell into them your rightful profit.

The man who sells Rolls Royce cars never figures how he can cut the price. He gets his profit without slicing off half to get the business. What's more, the people who want quality cars look him up to GIVE him the business.

The efficiency and adaptability of this type of pump are dependent upon the shape of the impellers and casing and the number of stages. The volute type consists of a casing of spiral shape with a gradually increasing water chamber, designed to convert velocity head to pressure head. In the

turbine type is provided a series of diffusion veins or ducts between the impeller and casing. In this type the fluid leaves the pump at practically the same velocity as that of the impeller.

The rotary pump has a revolving impeller, which is usually shaped like the figure "8." The lobes act to force the liquid from the inlet to the outlet. A pair of mating impellers is used. Rotary pumps are particularly adapted to handle such semi-fluid substances as starch, glue, glycerine, tar, oil, sludge and muddy water. Most types are direct-connected to motors.

#### Classes of Pumps

To get a clear idea of the possibilities presented by electric pumping it will be well to consider the different classes of pumping and the types of pumps particularly suited to meet the requirements of each class.

**Acid Pumps**—For this class of service it is usual to specify small sizes of centrifugal volute or turbine types equipped with rotors and casings of non-corrosive acid-resisting materials, such as monel metal. They are designed for use in chemical factories, storage-battery manufacturing plants, and for pumping water containing acid.

**Air Pumps** are usually of single or multi-stage, high-pressure types, or of the figure "8" type of low pressure blowers. They are used in sets for airbrakes, hammers, drills, for activated-sludge sewage systems, pneumatic water systems, forges, garage pumps, transformer vaults, and a number of similar applications.

**Boiler Feed Pumps**—Usually boiler-feed pumps are installed in dark, out-of-the-way places and are subject to neglect with consequent accumulation of dirt and grease. Under these conditions the motor-driven centrifugal pump has proved its worth because it occupies small space, is very reliable, is not subject to vibration, has high speed with consequent lower operating costs and is extremely simple in construction—usually having a single moving part.

**Brine Pumps** are built for use in pickle and sauerkraut factories, refrigerating plants, etc. The impeller and shells are made of metal which will resist action of salt. These pumps are usually of centrifugal or rotary type of low or medium capacity.

**Condenser and Circulating Pumps**—Slow or medium-speed, single-stage, centrifugal, volute types usually are applied to this type of service to supply low-head surface condensers with large volumes of water. They generally are equipped with special priming devices.

**Deep Well Pumps** generally are of vertical volute or turbine-centrifugal multi-stage type. They usually are of medium capacity and high head for raising water from great depths and consist of a series of impellers lifting the water in stages. They sometimes are air-lift pumps with the air cylinders submerged, air from a compressor being used to raise the water to the desired height.

**Drainage Pumps**—Vertical sump types of small capacity controlled by float switches are used usually for pumping out sump pits, excavations, man-holes, basements, etc. Low-head, high-capacity centrifugal or screw types usually are used for large drainage or reclamation projects, made in several sizes, speeds and heads.

**Fire Pumps** are of multi-stage, centrifugal type usually equipped with both hand and automatic control, actuated by pressure variation. In some cases they are equipped with variable speed motors, so that pressure may be varied to meet demand. On sprinkler systems some types consist of variable stages, which are cut in series when the sprinkler operates. Fire pumps usually are built in standard capacities of 500, 750, 1,000 and 1,500 gal. per min.



suction head of 30 ft. the efficiency of the pump and the amount of water handled will be affected to a marked degree, this characteristic being very noticeable as the suction lift is increased above 15 ft.

The general subject of pump applications is too large to cover in detail in an article such as his. There is, however, one type of pumping which is of interest to every estimator—and that is the handling of water. Most pumping problems pertain to the handling of water, in some form and this generally for purposes of agriculture or horticulture. A brief consideration of certain rules pertaining to this branch of pumping may prove of value to a number of our readers.

The prosperity of any one engaged in agricultural pursuits depends upon the measure in which the soil responds to methods of cultivation. The productivity of any soil is dependent upon the proper amount of water being supplied to it, either naturally or by means of irrigation.

In localities where the natural rainfall alone is depended upon, the farmer or rancher must rely upon the uncertainties of nature in predicting the measure of his crops. This has led many ranchers to sink wells and install pumping plants and the increased crop yield has paid for the installation in a comparatively short period of time.

While the centrifugal pump is used very widely, very little is known about its operation or design by the majority of its users. Most centrifugal pumps are driven by electric motors and their operating costs are definitely known quantities. The question of pump efficiency is therefore of paramount importance.

## Limitations

Generally speaking the standard horizontal type of pump, because of its efficiency and the small amount of attention required, will meet the demand of the average rancher where the water does not stand at any great depth below the ground. For best operation a centrifugal pump should not be required to pull over a maximum of 15 ft. suction. While it is possible to pump water, even under a

In a centrifugal pump there are certain fixed characteristics which develop during design and cannot be altered by adjustment on the job. For this reason the motor, especially in direct-connected types of apparatus, must be of such design as to operate efficiently with the particular pump it is desired to drive. Where it is possible to purchase both pump and motor from one manufacturer, the liability of selecting a drive too small for a particular installation is greatly reduced. In any case all equipment should be bought upon "guaranteed performance" specifications.

Pumping usually consists of discharging a given quantity of liquid or semi-liquid substance, expressed in "gals. per min." or "pounds" against a resistance usually expressed in "feet head." If the liquid is heavier than water, it is necessary to multiply by the specific gravity. Table X gives the specific gravity of various liquids and gases, while others may be obtained from almost any standard engineering hand book. In order to lift a substance from one level to another an expenditure of energy is necessary. If all friction could be eliminated a

Loss of Head in feet due to friction in various sizes of smooth 90 degree elbows, discharging the given quantities of water.

[illegible]

When pipe is rough add 15%; when very rough add 30%.

certain amount of power would lift a certain amount of liquid to a definite height.

That is "theoretical horsepower," but owing to the friction of the substance in the pipe, and the mechanical friction of the pump itself, the actual horsepower required always exceeds the theoretical. As an example: To pump 500 gallons of water per minute, 50 ft. high requires 6.6 theoretical horsepower. Actually to pump this water through a 5-in. pipe with a pump of 65 per cent efficiency, requires 10.15 hp. The ratio of the theoretical horsepower to the actual horsepower is defined as the efficiency of the pump and varies with different types and makes of pumps. Efficiency is the percentage of horsepower supplied which is turned into useful work. In the above example 10.15 is the actual horsepower required, while 6.6 is the theoretical, and 6.6 divided by 10.15 equals 65 per cent pump efficiency.

The economy of the pump is determined by its efficiency and as the operation of the pump extends over many years it can be seen readily that efficiency is of the utmost importance. The efficiency determines the operating and maintenance costs, so that a pump which is low in first cost may prove to be very expensive in the end. Efficiency presents an actual tangible saving, and provides the only way of computing relative values of any class of machinery.

For purposes of irrigation it is usual to allow one cu.ft. per sec. for each 70 to 100 acres. Under favorable soil

TABLE X

WEIGHT AND SPECIFIC GRAVITY				
LIQUIDS				
ACID—HYDROCHLORIC	74.5	0.0431	1.195	.46
—NITRIC	85.39	0.0552	1.530	.59
—SULPHURIC	14.35	0.0662	1.814	.64
ALCOHOL—GRAIN	50.346	0.0291	0.807	.32
—WOOD	50.504	0.0292	0.810	.32
AMMONIA	36.044	0.0225	0.683	.22
GASOLINE	45.952	0.0266	0.737	.30
TAR	62.35	0.0361	1.000	.39
TURPENTINE	53.43	0.0315	0.873	.31
VEGETABLE OIL	57.736	0.0334	0.926	.34
WATER	62.355	0.03606	1.000	.39
GASES				
AIR	0.00077	564.871	1.000	.38
AMMONIA	0.0075	332.5	0.599	.32
HYDROGEN	0.00559	35.13	0.0692	.32
NITROGEN	0.00763	546.1	0.9701	.32
OXYGEN	0.00892	624.4	1.105	.32

conditions and the use of diversified crops it is not uncommon to irrigate as high as 160 acres with one cu.ft. per sec. In most sections of the country the irrigation season is assumed to last about four months of the year, the water being pumped 24 hours per day.

The resistance against which water is pumped consists of the height it is to be lifted (pumping against pressure is the same as lifting it an equivalent number of feet), plus the pipe friction (between the points of intake and discharge) expressed as loss of head in feet, plus the given velocity—the result of which is known as the "total pumping head." The friction loss included in the total head can be computed from Tables I and II shown herewith. These tables are based upon values which are adequate for general estimating purposes. Tables covering pipes larger than 10 in. may be obtained from any manufacturer of pumps.

## Contractor Takes His Own Red Seal Medicine

Don Heumphreus, Santa Barbara Electragist, Builds Himself  
a Well Designed Complete Red Seal Home

Red Seal, like charity, should begin at home, thinks Don Heumphreus, of the Heumphreus-Smith Electric Company, Electragists of Santa Barbara. Accordingly in designing and building his new home at 3201 Calle Cedro Avenue, Mr. Heumphreus made it completely electric and moreover obtained for it the Red Seal emblem.

Primarily the Heumphreus home has been designed for comfort and convenience. Just because he was himself an electrical contractor influenced Mr. Heumphreus neither to underdo nor overdo the equipment of his home. True, he was determined to have the complete convenience if possible, but he achieved it without overloading the house with appliances or wiring. Everything installed must have a logical excuse for being there and an economic excuse as well. Particular attention was paid to control of lighting and heating, from the electrical standpoint, and to arrangement of rooms from the construction angle.

Entering the house from the back porch, the true entrance of the home as far as it is to be considered as a home laboratory or workshop, a number of interesting things are to be found. A 3-way switch controls the lights to the back porch. The back step, yard and front of garage are controlled by another 3-way switch. A 3-way switch in the garage also controls this lighting.

The rear porch has a power plug for a hotplate, to use for the wash boiler,

and a 220-volt outlet for the electrically heated ironer; a 110-volt outlet for the washing machine is adjacent to the stationary tubs. The 5-kw. Hot-point electric water heater is located in a closet at the end of this porch.

Often coming in from a job in soiled clothes, Mr. Heumphreus provided a small washroom and clothes closet for himself off one side of the back porch. A 3-way switch controls light for this room. This washroom has an entrance into his bedroom, for which a 3-way switch is provided, controlling light from the rear entrance or from the front hall. The room is lighted by four brackets and is provided with 2 duplex convenience outlets, all 6 of which are on a circuit of No. 12 wire. A heater outlet for a 1/5-kw. heater is provided. Lights on pull chain are found in all closets in the house which are cedar lined for moth protection. The front bedroom is also lighted by three brackets and has 2 duplex outlets, a heater outlet and a center light on a switch.

A short hall connects bedrooms and bath. The hall light may be controlled from the dining room, the front or rear bedroom, the bathroom, and kitchen. The bathroom is well equipped electrically. A 2-kw. flush type Wesix heater is set in the wall, controlled by a wall switch at the door. The bathroom is lighted by four lights, all controlled at the door, 1 ceiling light, 2 bracket lights over the mirror, and a water-proof light over the shower.

In the dining room one has the choice of convenience outlets almost anywhere. There are four outlets. The dining room table is itself wired with a convenience outlet from a floor outlet in the center of the room. A call plug located under the table is handy when entertaining. The room is heated by a 2,000-watt Majestic baseboard heater, placed under the windows. Three brackets light the room. The outlets in all rooms are so arranged that furniture may be moved to any desired location and still allow for convenience. A 4-way switch controls light to hall, living room, or kitchen.

Living room lighting consists of a center light, controlled on a 4-way arrangement so that it may be lighted from the entrance hall, dining room, or sewing room; three brackets, and mantel lights available from two plug outlets set flush instead of actual installing brackets, and used for candleabra or other fixtures. This room, too, is heated by a Majestic heater. It is equipped with radio outlets for antenna and ground and near the fireplace has a 220-volt, 5-kw. outlet for a glo-log. The fireplace is equipped with dampers necessary to successful electrical heating in this manner. There are three wall outlets and two floor outlets to care for davenport or table and allow any arrangement of furniture.

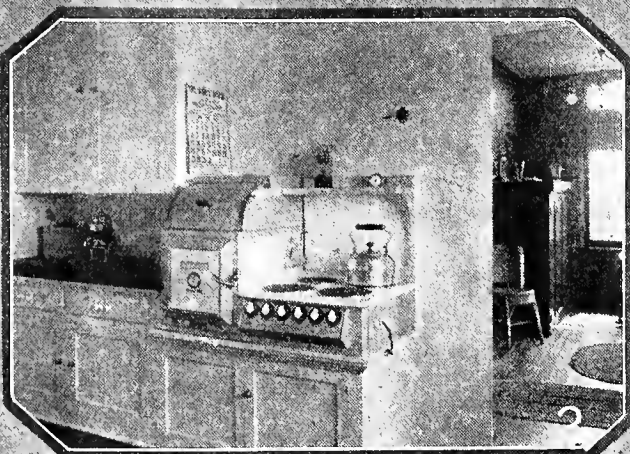
Kitchen arrangement is unique in many respects. The legs were removed from the Universal electric range, which was set upon cupboards. A shallow shelf under the range is used for storing pan covers and frying pans. A deeper shelf allows for pots and pans. A tray board pulls out under the oven, which has a side opening door, to allow for setting hot pots and pans from the oven. The range is the type equipped with a stainless steel oven; is of grey enamel finish and of 8,550-watt capacity.

The center light in the kitchen is controlled on a 4-way switch, from service porch, sewing room, dining room or kitchen. The sink light is on a switch instead of a pull chain to eliminate any possible danger resulting from operation of the light with wet hands.

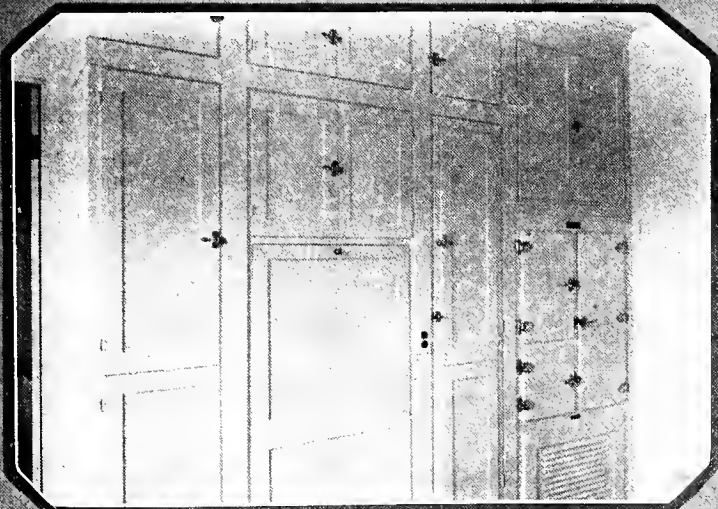
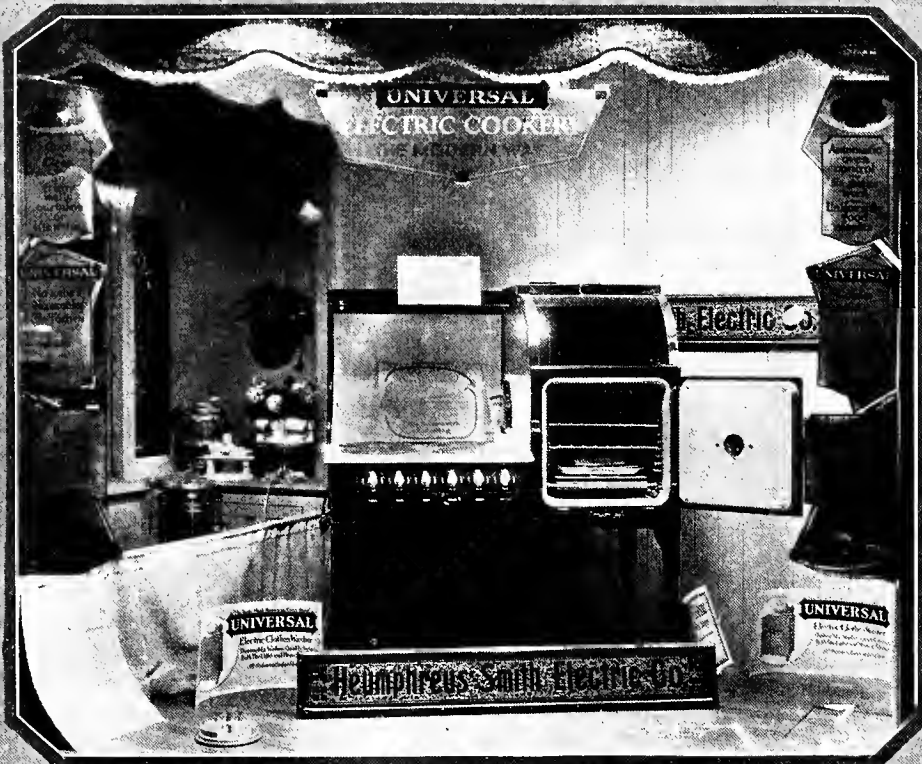
A Servel electric refrigerator is set flush with the cupboards on one side of the kitchen, the extra depth of the machine being taken up on the back porch. The motor has been cut over to use on a 220-volt circuit, giving improved operation. Ventilation of the motor and coils is provided by screen over the motor housing on the back porch side of the refrigerator. The refrigerator front is integral with a Peerless master-built unit, consisting of a folding table, a cooler, a broom closet, ironing board, and cupboard. An outlet in this unit provides a place to attach the toaster or waffle iron for breakfast in the kitchen.

A service of three No. 2/0 wires is brought to the house down the pole and underground to the rear of the lot. All conduit used in the house is galvanized. The main switch, range switch, water heater switch and distribution panel are combined on the back porch on one A-G Panel board.

One of the niceties of the Don Heumphreus establishment, and one much appreciated in practice, is that one key is used to allow admission to the front, rear and garage doors.



**RED SEAL** home of Don Heumphreus, Electra-gist of Santa Barbara, Calif. (1) Exterior of the home as seen from the street. Services are run to the home underground. (2) Kitchen, showing range with legs removed and cupboard space provided. A board under the oven may be drawn out to place hot dishes upon. (3) Window display in the Heumphreus-Smith Electric Company store in Santa Barbara. (4) Built-in unit, containing ironing board, breakfast table, etc., of which the refrigerator at right has been made an integral part. The back of the refrigerator extends to the back porch, (5) where it becomes part of cupboard space. A screened panel allows air to the refrigerator unit. This picture was taken before all fixtures were installed and work finished. The water heater, in its closet, was later lagged. Panel board at right contains all switches for lighting and heating.





# BETTER MERCHANDISING

## Let There Be Light---This Winter

Lighting, Whether Commercial, Home or Industrial, Should  
Hold Stage During Autumn and Winter

### Fifty Cents a Customer Quota Set in Campaign

Quotas were given districts of the Pacific Power & Light Company of Washington, Oregon and Idaho, to equal 50 cents a customer as the goal for a Mazda lamp campaign which started with a whirlwind effort on Sept. 1. Before nine days had passed the average of sales over the entire system had reached 7½ cents per consumer and the sale of lamps exceeded the lamps sold for the same period of last year by 211 per cent. On Sept. 11 the districts had sold an average of 1,040 lamps a day, a total of 9,360 lamps during the nine working days.

The lamp campaign undertaken by that company is being planned to continue to the first of the year. Up to the time of the campaign the average lamp sales per consumer amounted to but 27 per cent a year, indicating the size of the task laid out in this campaign.

The campaign is one of the first of its kind in the West, it is claimed. Lamps are being sold this year in all of the districts of the company, some of which have not previously merchandised lamps. The Edison Lamp Works is co-operating with the company in its campaign.

### Electric Advertising Talk Wins Ad Club Trophy

"The Electric Way Is the Modern Way to Advertise," a talk by P. P. Pine, power sales engineer of the San Diego Consolidated Gas & Electric Company, recently was awarded a trophy for the best five-minute talk before the Advertising Club of San Diego. A silver cup is awarded each year by Thomas Shore, president of the Ad Club, to stimulate interest in public speaking on advertising topics. Mr. Pine's talk, containing much good sales argument for any electrical contractor, follows in part:

In these days of increasing prices and narrowing margins of profit in business, executives are endeavoring to reduce expense as never before and the advertising appropriation is securing its full share of attention. Let us consider for a few moments an advertising medium which is available today at pre-war price in the face of an average increased commodity cost of more than 60 per cent. I refer to electricity.

The cost of electrical energy has been kept down to pre-war level by the

increased efficiency of production, making two pounds of coal or oil generate as much as required three pounds in 1914, by the interconnection of indi-

vidual companies' lines into super-power systems.

### Light Up for Dark Days and Nights

Shortening days of autumn and winter are made for the lighting salesman.

Everywhere the demand of the eyes is, "more light!" The desire to have this demand satisfied should prove to be the best sales help in the salesman's briefcase.

Lamp salesmen, alive to the possibilities, may relamp every empty socket in the home. Summertime nights cause empty sockets to go neglected. But winter comfort demands light.

Refixturing of homes now equipped with out-of-date and inefficient fixtures, opens further possibilities.

Commercial lighting should be at its best. Store windows need more light to compete with better-lighted windows everywhere about them. Store interiors are now in active competition with each other. There are still thousands of small stores lighted by eye-damaging bare lamps of high intensity on drop cords and placed in the line of vision.

Industries still need better lighting despite the completion of the Industrial Lighting Campaign. Enough good installations were made under the swing of that campaign to provide concrete examples of what good lighting can accomplish in better production, less spoilage, and fewer accidents. Industrial lighting should be easier to sell than it was before that campaign.

The old jobs need more attention than the new jobs. The field is wider. The need is greater. The profits await those who will SELL.

vidual companies' lines into super-power systems.

In this country the electrical industry has not been handicapped by gov-

### Consider the Electric Sign

Ordinarily when we consider electrical advertising we think of electric signs. Originally these were used merely to spell out the name of the firm or the product in electric lamps, but they have been developed by the use of beautiful and spectacular designs until today this is the most striking and effective method of putting a product before the public. Electric signs take advantage of the highest receptivity of the minds of the crowds as they stroll the streets at night, unhurried by business cares. They are the only method of securing life-like animated figures, and electric signs are the most striking advertising medium in the world today as they flash their message in letters of fire against the background of the night.

### Street Lighting Helps

White way lighting is coming into increasing demand as an advertising medium. Who can estimate the publicity value of the "great white way" of New York City with its 1,000,000 electric lamps? Business men in many communities have changed the shopping center from one point in the town to another by the use of this medium, attracting the crowds of shoppers to the more brightly lighted section as unerringly as iron filings are attracted by the magnet. That San Diego is beginning to appreciate this form of advertising is shown by the fact that as many ornamental lighting standards have been installed in this city in this one year—1925—as in all its previous history.

### How Is the Store Lighted?

Much has been said regarding the psychological moment of closing a sale, but when is a more opportune time of overcoming sales resistance or changing the buying habits of a prospect than when he is in front of your store? Effects can be secured by color window display lighting which will cause a large number of passersby at night to stop and examine your goods. The use of an abundance of light in a store interior has an advertising value.

It should not be necessary for the prospect to bring the goods to the win-



dow in order to examine them, nor for him to go away dissatisfied because insufficient illumination does not allow him to make certain that they suit his requirements. Besides this, the use of an abundance of light lends that air of cheerfulness which is so conducive to the buying state of mind. That is the reason why some chain stores who keep account of their costs even to the extent of figuring their wrapping paper expense per dollar sale, are extravagant users of light, realizing that for every dollar spent therefor they secure more than a dollar in return.

Deluxe illuminated billboards and radio broadcasting are up to date advertising mediums which have secured results, but I have not time to discuss these now.

On account of its economy, its efficiency and its effectiveness, the use of electricity as an advertising medium is coming into increasing demand. In this field, as in a dozen and one other realms of human activity today, the ELECTRIC WAY IS THE MODERN WAY.

### Manufacturer Offers Lighting Estimating Service

A simplified plan to further man-to-man co-operation between manufacturer, jobber and dealer has just been introduced by Curtis Lighting, Inc., and is said already to have taken hold quietly and with success.

It is entitled the "Jerry Plan," and provides an easy and effective means for these reflector manufacturers to help their jobbers' salesmen and dealers to secure more good prospects for show window lighting. Besides this, it "personalizes" the service rendered to the distributor salesmen by the Curtis engineering department.

"Jerry" is J. L. Stair, chief engineer for Curtis Lighting, Inc. "Jerry" promises to recommend the suitable X-Ray reflectors for a prospect's show windows and do the greater part of the work if the salesmen will supply him with the necessary information

about the job in a "Sale Starter," a folded sheet addressed to Mr. Stair at the home office of Curtis Lighting, Inc., in Chicago. A gummed flap seals it ready for mailing. When unfolded it consists of a center sheet and two side flaps. After the space for the name and address of the prospect, there are lines to be filled out giving names of the salesman, the jobber, dealer or central station he is working with, the company to which the recommendation should be sent and the electrical dealer to sell the job. The salesman is also asked to tell whether or not the local central station is co-operating in the sale.

On one side flap are sketched eight general styles of window lighting, and the salesman is requested to check the style used at present in the prospect's show window. On the other flap is a cross-section of a typical show window with lettered dimensions. Below in question. There is also a cross-sponding letters, and the salesman can fill this in giving the size of the window in question. There is also a cross-section area of the "Sale Starter" for a rough floor plan of the window.

An engineering recommendation is then sent the salesman and assistance given him by the company's representative in making the sale. Results from the plan are already reported to be showing the idea a good and a workable one.

### "Trouble" Advertisement Brings Flood of Inquiries

That there is an opportunity for the small electrical contractor-dealer to establish a good business in the repairing of electrical troubles of minor character is given unusual support in the experience of the Schockett Electric Company of Denver. Mr. Schockett ran the advertisement illustrated here for five weeks, just once each week, in the largest daily evening paper in Denver. Then the fun began.

The replies, inquiries and requests for prices came flooding in, and work

piled up to such an extent that he had to discontinue the advertisement. Mr. Schockett declares that the results obtained were just 100 times as much as his previous efforts in using direct-mail.

The Schockett Electric Company service wagon was kept so busy tend-

### Electrical Troubles

Around the Home Need Not Worry You Any Longer

Phone us any time. Broken wires, burnt out fuses, globes, switches, disconnections, electric washers, electric irons, extensions or anything electrical.

Our service truck fully equipped with all the necessary tools and materials, managed by a competent licensed electrician, will be in your neighborhood tomorrow.

Call Main 8229 and avail yourself of this time and money-saving electrical service plan. Our electrician will call on you and tell you in advance what the charges will be.

No delays, no disappointments. You save money on this new method of electrical repairing. Call NOW.

**The Schockett Electric Co.**

OFFICE M-8229 WIRING AND FIXTURES NIGHT  
Offices and Showrooms, 408 15th St. M-8308



This advertisement started the deluge of orders for repair work, estimates, and advice. Run once a week for five weeks, it had to be discontinued because the work was piling up too fast.

ing trouble calls elicited by the advertisement that it could not attend to other important work for the company. And one of the most pressing problems in connection with the idea was that the proper type of man to handle the business for the company was hard to get. It was impossible for Schockett



The service car of the Schockett Electric Company, used in making repair calls.

or his foreman to give their entire time to the work, which seemed to require it. The job required besides a good journeyman, one who could estimate, advise and discuss the preliminaries concerning various jobs, and sell as well.

Yet the experience of the Schockett Electric Company proves that there is a demand for just this sort of service, and that there is opportunity for someone to specialize in this particular work and build up a good business, letting the public know that such service is available through good advertising.

**Hoover Company Offers Prizes for Window Display Contest.**—To be known as "Hoover week," the week of Dec. 4-11, will be made the annual mid-winter window-display competition time for Hoover dealers this year, according to recent announcement. Prizes of \$100, \$85, \$70, \$50 and \$25 for the best 12 window displays of Hoover cleaners will be awarded. Electric dealers, hardware and furniture stores are eligible to the contest. Help is offered by the company to aid in making attractive displays for entry into the contest.

THIS FLAP IS GUMMED, READY TO SEAL  
**NO ENVELOPE NECESSARY**  
FOLD, SEAL AND STAMP

DEAR JERRY:— HELP ME SELL X-RAY REFLECTORS TO THIS PROSPECT.

ATTENTION OF MR. \_\_\_\_\_ KIND OF STORE \_\_\_\_\_  
STREET ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

HERE IS A "SALESTARTER" PREPARED BY ME \_\_\_\_\_ I SELL FOR THE FOLLOWING  
(GIVE YOUR NAME) \_\_\_\_\_  
COMPANY \_\_\_\_\_ (JOBBER - DEALER - CENTRAL STATION)  
MY ADDRESS IS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

I HAVE RECOMMENDED \_\_\_\_\_ X-RAY REFLECTORS NO. \_\_\_\_\_  
SEND (FOR) \_\_\_\_\_ COPY OF RECOMMENDATIONS TO MY HOME OFFICE  
ATTENTION MR. \_\_\_\_\_

I AM ASSISTING THE FOLLOWING ELECTRICAL DEALER TO SELL THE JOB.—  
DEALER'S NAME \_\_\_\_\_  
STREET ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_  
SEND (FOR) \_\_\_\_\_ COPY OF YOUR RECOMMENDATIONS TO THIS DEALER  
THE LOCAL CENTRAL STATION (IS NOT) CO-OPERATING IN THE SALE  
SEND (FOR) \_\_\_\_\_ THEN A COPY OF THE RECOMMENDATIONS  
NAME OF CENTRAL STATION \_\_\_\_\_  
ATTENTION MR. \_\_\_\_\_

DRAW A FLOOR PLAN OF THE SHOW WINDOW ON THE CROSS-SECTIONAL AREA BELOW

Style of Lighting Equipment in the Show Window at Present is Checked Below

Locate outlets on plan where lights are now used.

ATTACHMENTS FOR COLOR LIGHTING.

SHOW WINDOW FLOODLIGHTS  
Rev. No. 33 for 200 watt lamp  
X-Ray No. 38 for 100 watt lamp

Typical cross section of a show window  
Dimensions as shown above

Draw a floor plan of the show window on the cross-sectional area below

SHOW LENGTH OF EACH PART OF WINDOW

Folding mailer upon which the salesman or dealer records information regarding a window lighting prospect from which "Jerry" makes the estimate and recommendations for layout.

### Hotpoint Christmas Range Sales Plan Detailed in Manual

By means of an attractive brochure in which is outlined a complete sales plan for electric ranges as Christmas gifts to women of the home, the Electric Appliance Company has recently announced its 1926 Christmas sales plan for ranges. The slogan adopted is "What Mother Really Wants."

The booklet starts with the reasons for inaugurating the campaign, offers time-payment information, urges the enlistment of employee support of the plan, outlines advertising plans and offers material for an advertising campaign in direct mail, letters, newspaper advertising, window displays, store demonstrations, guessing contests, truck banners and car cards.

The all-white Hotpoint automatic range and the de-luxe automatic are the two models featured in the campaign, for which national advertising is also being done.

### Merchandiser Wins McGraw-Hill Honor for Sales Policies

With the following citation, one of the McGraw-Hill awards for 1926 was presented to G. Fred Laube, at the Electragist convention at Cedar Point, Ohio, recently. It is testimony of recognition of a valuable contribution to the art of electrical merchandising.

G. Fred Laube, president Laube Electric Company of Rochester, N. Y., believing that there is a considerable element of nuisance involved in the high pressure door to door canvassing method of selling electrical appliances, which he feels affects the good reputation of all the local appliance merchants, initiated in his store a method of merchandising in which he relied upon excellence of display and a thoroughly organized program for the education of prospects and customers. Establishing what he calls an "electrical department store" in which the display of associated lines is very carefully studied, he has succeeded in bringing to his store by invitation successive groups of women for the inspection of specific appliances and instruction in their use, without obligation or influence to buy.

At the same time, by displaying together with standing lines and in direct comparison, the low priced appliances commonly featured in drug and department stores, he has made a frank constructive demonstration of quality, and while offering the full range of prices has greatly increased the popular preference for better goods.

This method happily has proved profitable, has resulted in raising the dignity of electrical appliance selling in Rochester and has benefited all local dealers. In recognition of the principles involved in this constructive contribution to the advancement of the contractor-dealer branch of the electrical industry, the judges have extended to Mr. Laube a certificate of Honorable Mention, given under the James H. McGraw Award for 1926.

**Place Appliance Shops in Piggly-Wiggly Stores.**—Frank E. Paige has just opened the third Thor Electric Shop which he has located on floor space leased in a Piggly-Wiggly store at 243 East San Fernando Boulevard, Burbank, Calif. Another appliance specialty shop was recently opened in a Piggly-Wiggly store at 269 Sherman Way, Van Nuys, Calif. The location is claimed to give his store access to hundreds of housewives in the course of their shopping each day.

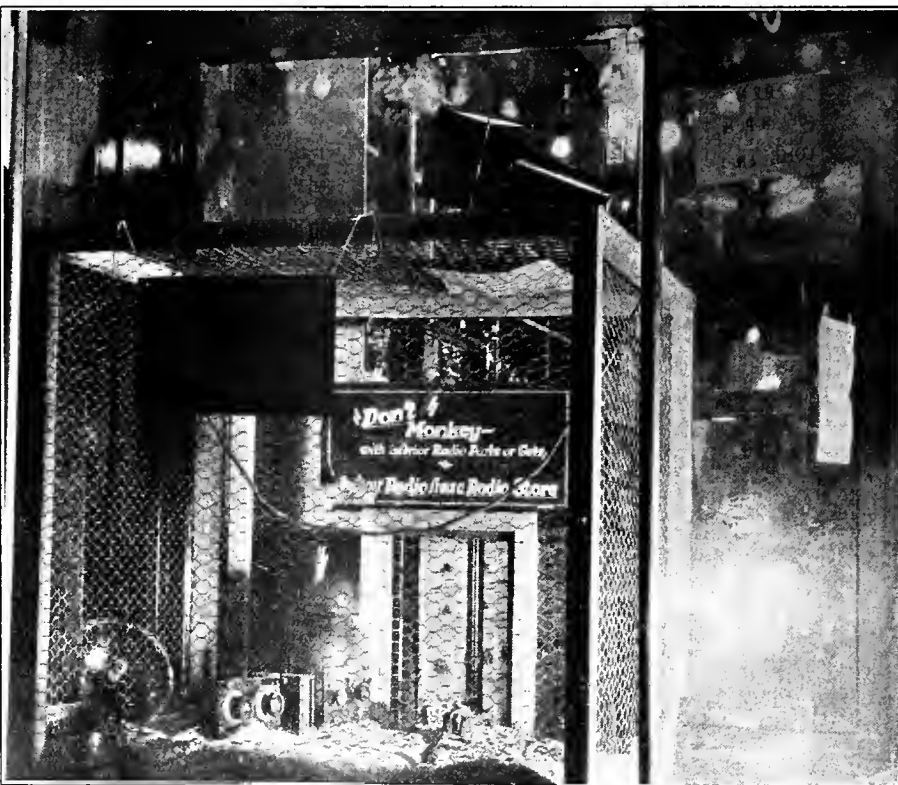
**The Dalles Wins Hughes Trophy in Range Campaign.**—The George A. Hughes trophy, presented by the Edison Electric Appliance Company, was won by The Dalles district of the Pacific Power & Light Company in the annual Hotpoint range campaign this year.



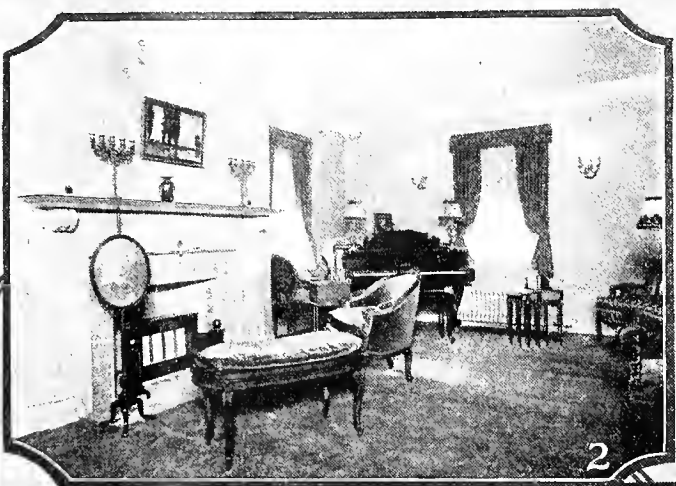
Window display in the Lancaster district office of the Southern California Edison Company showing what can be done with the stock window trim furnished by the manufacturer.



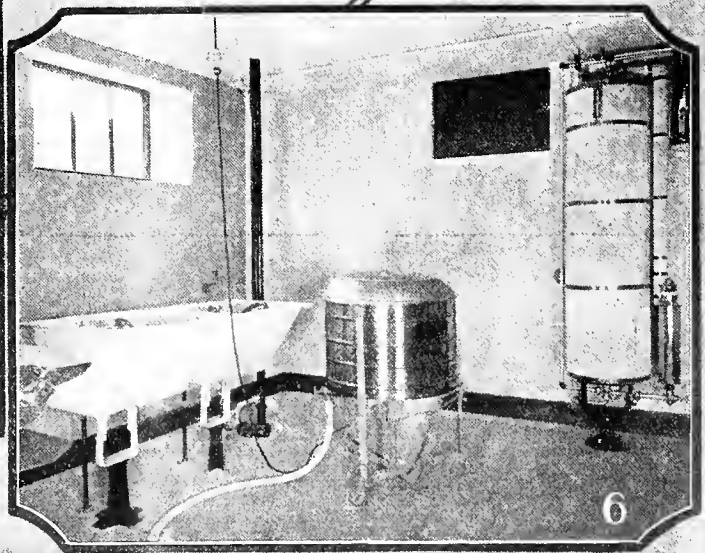
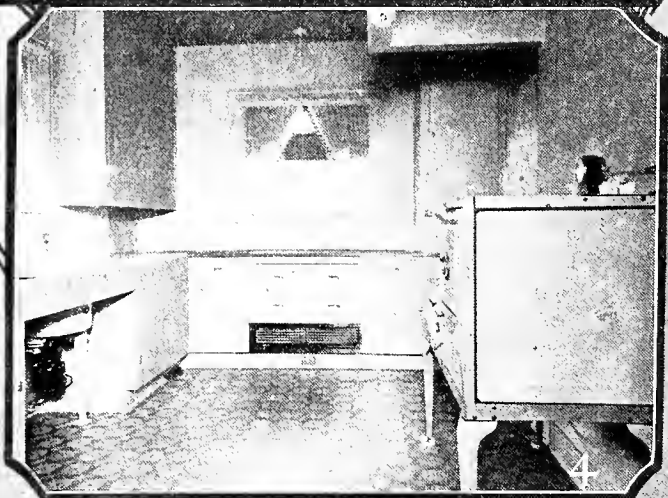
A fifty-dollar prize vacuum cleaner window designed and executed by Eugene T. McSpadden, display manager of the Public Service Company of Colorado. The contest was arranged by the Hoover Suction Sweeper Company. The two signs read (left): "It's quite a step from the crude days of wearing these rugs to the modern cleaning of them with the new improved Hoover." (Right): "Be modern. Don't try to live in the age of the Navajo. Equip your home with the best cleaner money can buy—the Hoover."



"Don't Monkey with Inferior Radio Parts or Sets." This slogan, surrounded by a lifelike monkey cage in which radio parts were held prisoners, attracted considerable attention in the windows of the California Mechanical & Electrical Engineering Company, Sacramento, Calif., where it was displayed. "Buy Your Radio from a Radio Store" was the forceful follow-up message.



**C**OMPLETION last November of Julia Groo's \$15,000 prize home, won in the National Home Lighting Contest, 1924, was made the occasion for Portland's first electric home exhibit. Registered visitors, conducted through the home during the month display of the home, numbered 23,148. They were shown a home tastefully decorated, well lighted, adequate in convenience outlets, telephone and radio plugs, completely furnished with modern housekeeping aids, and heated by built-in electric heaters. (1) Hallway. (2) Living room. (3) Dining room. (4) Kitchen. (5) and (6) Basement laundry room and switchboard.





# NEWS OF THE INDUSTRY

## Unconditional Ratification of Six-State Compact Refused by California

By a vote of 34 to 3 in the Senate and 68 to 8 in the Assembly the California legislature, assembled in special session Oct. 22 at the call of Governor Richardson (Journal of Electricity, Oct. 15, p. 309), refused to ratify unconditionally the six-state Colorado River Compact. Instead a resolution was passed by both houses reaffirming the reservations to California's acceptance of the contract as added during the 1925 session of the legislature. The resolution stated that "it is unnecessary and inadvisable to take action respecting the Colorado River compact as contemplated in the call for the session," and "that the plan of handling interstate rights and relations respecting the waters of the Colorado River, as expressed in the Swing-Johnson Bill, is hereby approved and assurance is hereby given that, upon the passage of said bill the state will take such action as may be necessary to render the bill operative and the compact unconditionally effective." The resolution was introduced by State Senator Ralph E. Swing of San Bernardino, brother of Congressman Phil Swing, co-author with Senator Hiram Johnson of the Swing-Johnson Bill.

Governor Richardson's call for unconditional ratification was based on the ground that no action could be taken by Congress at the forthcoming session on the Swing-Johnson Bill until the six-state compact had been ratified unconditionally by California because the bill contains a provision requiring

the approval of six of the seven signatory states "without condition, save that of such six-state approval, and until the president by public proclamation shall have so declared." The governor further pointed out, "this bill further makes the approval of the compact by the United States 'effective when at least six of the signatory states, including the state of California, shall have approved or may hereafter approve said compact as aforesaid and shall consent to said waiver.'"

The reservation to the six-state compact added by the 1925 legislature stipulated that California's ratification should not become effective until after a reservoir of 20,000,000 acre-ft. capacity at or below Boulder Canyon on the Colorado River had been authorized for construction by the United States.

## Wheeler Fish Lift Approved by Oregon Fish Commission

The Wheeler patent fish lift, a device for raising fish over dams, has been approved officially by the Oregon Fish Commission. The lift was invented by J. R. Wheeler, district manager in Reedsport, Ore., for the Peoples West Coast Hydro-Electric Corporation.

A description of the lift and of the successful demonstration of its use appeared in the Oct. 15 issue of the Journal of Electricity on p. 308.

## Modesto Power Contract Ratified by San Francisco Board

The contract between the city of San Francisco and the Modesto Irrigation District for the furnishing of power for standby service from the city's Hetch Hetchy plant finally has been ratified by the Board of Public Works of San Francisco. The contract was accepted by the irrigation district on Oct. 4. Under the provisions of the agreement the city must furnish standby service to the extent of 3,000 kw. at a flat charge of \$4,200 per annum and a kilowatt-hour charge of 4.7 mills for all energy used.

Official protest against the terms of the contract was made by M. M. O'Shaughnessy, city engineer of San Francisco, on the grounds that the price failed to reimburse the city for the cost of service (Journal of Electricity, Sept. 15, p. 216), and the ordinance passed by the Board of Supervisors ratifying the contract was vetoed by the mayor on the same grounds and again passed by the supervisors over his veto. (Journal of Electricity, Oct. 1, p. 310.)

In order to receive the power the Modesto Irrigation District is to build a substation at a point in the district adjacent to the Moccasin-Newark transmission line. The agreement specifies that the power can be used only for pumping and municipal purposes as provided for in the Raker Act.

## New Rate Schedule Put in Effect by B. C. Electric Company

With reductions and new rates put in effect in rural districts on Nov. 1, all domestic and commercial lighting customers of the British Columbia Electric Railway Company in the mainland district are now on two-step rates.

In country districts and towns several domestic rates have been in force, the most extensive being a block rate starting at 11 cents gross with a prompt-payment discount of 20 per cent. The new domestic rate is 7 cents net a kw-hr. for the first 3 kw-hr. per 100 sq.ft. of floor area and 3 cents a kw-hr. for all current in addition.

This conforms with the type of rate in Vancouver and suburbs where, however, the steps are 4½ cents and 2 cents and 5½ cents and 2 cents. Altogether some 5,000 accounts are affected.

The new commercial rate is 7 cents a kw-hr. for the first 100 kw-hr. per 100 kw. of demand and 3 cents a kw-hr. for all current in addition. About 1,100 customers are affected by this rate, which replaces a block rate beginning at 11 cents gross or 8.8 cents net.

Quantity discounts are allowed customers with installations of more than 10 kw. but only on the first step of the rate.



The Utah Power & Light Company's exhibit at the Utah State Fair, held recently in Salt Lake City, was awarded first prize. One of the principal attractions at the fair, it represented a miniature power plant. By clever mechanical arrangement a moving wheel which represented a generator was visible through the windows, the visibility being limited in order to give the proper effect of the interior. Water in the reservoir seemed to be in motion, and water appeared to be flowing over the dam. In the background, which presented a beautiful setting, clouds were moving continuously. The general effect was natural to a remarkable degree. In connection with the power plant portion of the exhibit a model kitchen was shown, and the message conveyed through the entire display was the impression of service and efficiency at the turn of a switch.



## Idaho C.R.E.A. Reports on Farm Electrification in State

Idaho's electric power installation on its farms is in larger proportion than any other state except the three Pacific Coast states and two New England states, according to the progress report of the Idaho Committee on the Relation of Electricity to Agriculture.

The report shows further a close correspondence between irrigation and the use of electricity on the farms. In other words, the report shows that the use of electricity is greatest on irrigated farms, not so great in the semi-dry areas, by which are meant the north Idaho wheat region, and sparse in the dry farm areas.

The total number of rural consumers receiving power in Idaho is reported by the thirty-six power companies of the state to be 7,006, served by 1,259 miles of rural distribution lines.

"The irrigation pumping load," states the report, "is a special factor in the rural use of electricity in Idaho. A large part of the total power utilized in the state is supplied to irrigation pumping. The high-tension lines (to supply these units) running across the farm make it possible to install small substations to supply rural distribution lines."

To illustrate the use of power on the farms in southwest Idaho the following table of rural statistics, summarized for the region, is printed in the report:

Number of consumers.....	3,981
Miles of rural line.....	618
Total acreage.....	160,500
Acreage cultivated.....	134,350
Hp. of domestic motors.....	1,095
Hp. of irrigation motors.....	2,096
Other power.....	2,039
Ranges.....	693
Water heaters.....	280
Washing machines.....	1,994
Irons.....	3,205
Vacuum cleaners.....	840
Percolators.....	182
Toasters.....	323
Grills and plates.....	373
Waffle irons.....	119
Ironers.....	8
Battery charging rectifiers.....	8
Sewing machines.....	91
Air heaters.....	120

## Electrically Driven Ferry Boat Launched at Oakland, Calif.

The Key System Transit Company's electric-drive ferry boat Peralta was launched from the Moore Dry Dock Company's yard in Oakland, Calif., Oct. 14. The vessel is the first of two sister ships to be launched; the second is to be known as the Yerba Buena.

The boats have an over-all length of 276 ft., a breadth over guards of 70 ft., and a molded depth of 21 ft. The designed speed is 14.5 knots normal and 15 knots maximum. These boats are claimed to be the largest direct-current, electrically driven ferries ever built, there being installed in each two 2,600-shaft-hp. electric motors, supplied with power from a single turbine-generator unit, which also supplies necessary power for auxiliaries, light, control system and other uses.

The Westinghouse Electric & Manufacturing Company is supplying the complete electrical machinery throughout for each vessel. The boats will be controlled from the pilot house, the

pilot having full control of the main motors at all times. There will be located in the engine room an emergency control stand for operation similar to that located in the pilot house, in the event that it is desired to control the ship from the engine room as is done on the ordinary vessel.

Most of the auxiliaries will be driven by enclosed self-ventilated motors with the new type "sealed sleeve bearings." Auxiliary controllers will be of the magnetic push-button type, the contactor panels being enclosed in drip-proof cabinets. Electrically driven steering gears that will operate both rudders at one time from either pilot

## League's Booth at Fair Stresses Proper Home Lighting

The Rocky Mountain Electrical Co-operative League conveyed the message of eyesight conservation through proper home lighting in its exhibit at the Utah State Fair held recently at Salt Lake City. As shown in the accompanying illustration, the display presented a contrast as between proper and improper lighting in the home, especially as it concerned the pupil who must do some of his studying at home. As the fair visitor approached this exhibit he saw one boy (in cut-out design) whose face told the story of



The contrast between proper and improper lighting and the effect of each were presented graphically by the exhibit of the Rocky Mountain Electrical Co-operative League at the recent Utah State Fair

house are a new and interesting feature in connection with this installation.

The Peralta was named in honor of one of the early California families and was sponsored by Mrs. Herminia Peralta Dargie, a member of that family.

## Utah Engineering Council Issues Official Publication

With the October number The Utah Engineer, official publication of the Engineering Council of Utah, makes its initial appearance. Its purpose, as stated in the foreword, is "to cultivate a spirit of mutual helpfulness, individually and collectively, in the engineering fraternity of the state of Utah, and to furnish a medium of contact through which we may all express our views on subjects of common interest."

Ralf R. Woolley, in charge of the United States Geological Survey in Salt Lake City, is editor, and M. L. Cummings, Jr., of the Utah Power & Light Company and editor of its house organ, The Synchronizer, is managing editor. The office of the publication is 624 Kearns Building, Salt Lake City.

Los Angeles Gas and Electric Corporation Authorized to Issue Stock.—Los Angeles Gas and Electric Corporation has been authorized by the California Railroad Commission to issue and sell, at not less than par, on or before June 30, 1927, \$1,500,000 of its common capital stock, and to use the proceeds to reimburse its treasury and finance in part the cost of extensions and betterments.

eyestrain, studying under glaring lights, while in the other corner was a youngster apparently at perfect ease, with the proper light provided for his study efforts. The contrast was very striking, and placards, in which brief copy was used, posted inside the room, helped to bring out the point at first glance.

A small amount of copy also was used on the front of the booth, further to convey the message of eyesight conservation through better home lighting.

## Grant of License on Pine Creek, Wyo., Held Hopeful Sign

The action of the Federal Power Commission in granting a license to the Best Flume & Power Company on Pine Creek at Pinedale, Wyo., has given rise to hope among those interested in other projects on the remote tributaries of the Colorado. Pine Creek is an upper tributary of Green River.

The commission last year adopted a resolution declaring its intention to take no action on projects in the Colorado River Valley. The idea was to give the states in the basin a further opportunity to work out an agreement as to the use of the waters of the Colorado and its tributaries. A number of projects and contemplated developments which have no direct bearing on the Colorado River controversy feel that they should not come within the scope of the resolution. It seems probable that the commission will consider separately any such project and there always is the possibility that it will tire of waiting on action by the states and may withdraw its resolution.

## Erection of Public Service Building in Portland to Start Immediately

Construction of the new Public Service Building, to house the offices and salesrooms of the Pacific Power & Light Company, Northwestern Electric Company and Portland Gas & Coke Company, Portland (Journal of Electricity, Feb. 1, 1926, p. 112), is to start at once, according to announcement made recently by Guy T. Talbot, president of those companies, coincident with the letting of the contract for over \$1,500,000. The building, which will be fifteen and one-half stories in height, will occupy the half-block on the east side of Sixth Street between Taylor and Salmon Streets.

The three companies will occupy all but six floors of the building, including the ground floor and two basements. One basement will house a new large substation of the Northwestern Electric Company. The ground floor will be divided between the Northwestern Electric Company and the



Artist's drawing of 15-story Public Service Building to be erected in Portland for the Pacific Power & Light Company, Northwestern Electric Company, and Portland Gas & Coke Company

Portland Gas & Coke Company principally for appliance display rooms and for the convenience of customers paying bills. The entire third floor is to be given over to facilities for the employees of all three companies and will contain recreation and rest rooms, an assembly room, a library, a restaurant, and an emergency hospital. Six floors will be available for rent by the general public.

The building, which will be the tallest in Portland, is of Italian Renaissance style, with marble floors and wainscoting in the corridors. The spacious lobby will be of marble with an ornamental ceiling. It will be of concrete and steel construction, will have a green tile roof, and will be faced with terra cotta and granite brick. Five of the latest type of signal control elevators, with a speed of 800 ft. per minute, will provide traffic facilities in the building. The first two floors will extend over the entire half-block, and the remaining thirteen and one-half floors will occupy the central 100 ft. of the property, thus creating a

tower-like effect. When the future demands it the side wings may be extended upward to the height of the twelfth floor without destroying the architectural beauty of the building. It was designed by A. E. Doyle, architect, and the contract has been let to L. H. Hoffman, contractor, both of Portland.

### Utility Plans 13-kv. Line to Supply Tahoe Territory

Authorization has been granted by the California Railroad Commission to the Truckee River Power Company, Reno, Nev., to exercise the rights under a franchise for which it has applied to the Board of Supervisors of Placer County, if that franchise is granted by the supervisors.

The power company has been operating a public utility to a comparatively limited extent in California east of the summit of the Sierra Nevada adjacent to the Nevada state line, and it now proposes to construct a 13,000-volt line from its substation at Truckee southerly to Tahoe City on the north shore of Lake Tahoe with branch lines in both directions along the shores of the lake as far as Brockway on the north and Meeks Bay on the south, in order to supply electric service to hotels, resorts and summer homes adjacent to Lake Tahoe.

Other actions taken by the commission recently include the following: authorization to the Great Western Power Company of California to sell and the Pacific Gas and Electric Company to purchase and operate an electrical distributing line and appurtenances in the Seaside and Pescadero school districts in San Mateo County; authorization to the Lake County Water & Power Company, operating a hydroelectric plant which serves energy for light and power in Kelseyville and adjacent territory, to sell its system to the California Telephone & Light Company; authorization to the Alturas Electric Power Company and the Mendocino Electric Light & Power Company to sell and transfer their properties to the Peoples California Hydro-Electric Corporation.

### Salmon River Company Bought by Idaho Power Company

Purchase of the Salmon River Light & Power Company of Salmon, by interests allied with the Idaho Power Company, of Boise, Idaho, has been announced. The property includes a diversion dam on Lemhi River, generating equipment and transmission lines to serve the town of Salmon and mining properties in Salmon.

Ralph Irvine, manager of the Salmon River company, will be retained in that capacity. About \$100,000 was involved in the deal, it was stated.

The addition of the Salmon, Livingston, Red Bird and Leadore mining districts to the system of the Idaho Power Company, as well as a rapidly developing agricultural district, is the feature of the transfer of this property.

### Position of Chief Plant Engineer Open in Philippines

The U. S. Civil Service Commission has announced an open competitive examination for the position of chief plant engineer to fill a vacancy in the Quartermaster Corps, Fort Mills, Philippine Islands, at \$3,600 a year and quarters, and vacancies occurring in positions requiring similar qualifications at this or higher or lower salaries. Applicants must hold a degree in electrical or mechanical engineering and have at least four years of progressive professional engineering experience, including at least two years in responsible charge of the installation or operation of steam and electric power plant equipment.

The duties are: to be in responsible charge of the operation of a large power, electric and refrigeration plant located on Corregidor Island; to supervise construction and repair work on the plant; to superintend the work of maintenance and operation of the water systems. The work involves the direction of a fairly large force of workmen, including prison labor.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil service examiners at the post office or customhouse in any city. Applications must be on file at Washington, D. C., not later than Dec. 7.

### Frigidaire Separated from Delco Light by General Motors

Recognition of the importance of the electric refrigerator industry has been made by the General Motors Corporation by creation of a new subsidiary, Frigidaire Corporation. This corporation will in the future have charge of the distribution and sale of all electric refrigerator products sold under the trade name "Frigidaire."

During the past year Frigidaire sales have grown from a very modest figure to a point where they surpass in volume certain other members of the General Motors family with every indication that they may climb still higher in the near future.

In creating this new subsidiary Frigidaire has been completely separated from the parent unit, the Delco Light Company, giving it all the factory space previously occupied by the Delco Light Company and placing it on what amounts to terms of equality with the corporation's automobile factories.

The new corporation is headed by E. G. Biechler, president and general manager.

Under the new plan of operation Frigidaire Corporation will have two factories with a total of 53 acres of floor space in use or under construction, which will give it a capacity of 50,000 electric refrigerators a month.

Frigidaire Corporation is now engaged in extensive organization effort, reassigning quotas, building up its selling force and planning a still more extensive advertising campaign for 1927.

**B. C. Company Opens New Chilliwack Store.**—The British Columbia Electric Railway Company, Ltd., Vancouver, has opened an up-to-date electrical salesroom at Five Roads in Chilliwack.

## Electrical Manufacturers Form National Association

National Electrical Manufacturers Association is the name of an organization consisting of 270 leading electrical manufacturers formed recently in New York following the merging of the Electric Power Club, the Associated Manufacturers of Electrical Supplies, and the Electrical Manufacturers Council. Gerard Swope, president, General Electric Company, was elected president of the new association, and J. W. Perry, vice-president, Johns-Manville, Inc., treasurer.

The general purpose of the new association is to advance the art of manufacturing adequate and reliable electrical equipment. A very important consideration is the standardization of electrical apparatus, which ultimately will mean lower costs and lower selling prices to the public, and co-operation with the Department of Commerce in its constructive work, not only in standardization but also in its work of simplification.

Specifically, the objects of the new association, according to its constitution, are to further the interests of the makers of electric apparatus and supplies in manufacturing, engineering, safety, transportation and other industrial problems; to promote the standardization of electrical apparatus and supplies; to collect and disseminate information of value to its members or to the public; to appear for its members before legislative committees, governmental bureaus and other bodies in regard to matters affecting the industry; to promote a spirit of co-operation among its members for the improved production, proper use and increased distribution of electrical apparatus and supplies.

## Columbia Basin Financing Plan Being Worked Out

A definite plan for financing development of the Columbia River basin is being worked out by Washington state interests, according to Herbert Hoover, Secretary of Commerce, who spent more than a week in that section during his recent Western trip. The plan will include ultimate irrigation of some 12,000,000 acres of land as well as power development.

Secretary Hoover said that he believes the irrigation works in the Columbia Basin can be handled with approximately \$125,000,000 as a revolving fund, as the land will pay its way as opened to cultivation gradually. The work would require ten years time, the Secretary said, and by the end of that period the growth in population would make it profitable to put the area into cultivation.

## California Utility to Enlarge Spring Gap Plant

The Sierra & San Francisco Power Company has applied to the Federal Power Commission for a license to cover its constructed Spring Gap project in the Stanislaus National Forest in California. The plant was constructed under a permit issued by the Department of Agriculture. As it now is desired to expand and reconstruct it, it is necessary to take out a license under the Water Power Act. The dam at Big Dam is to be rebuilt and enlarged, as is the dam at

the New Strawberry reservoir. The Herring Creek diversion dam and canal are to be reconstructed. The Philadelphia ditch and penstock are to be enlarged and the capacity of the Spring Gap power house is to be doubled. The license also is to cover a transmission line from the power house at Spring Gap to the power house on

## P.C.E.A. Commercial Section Plans Big Conclave

Two or three national figures in central-station merchandising fields will speak on the program of the general conclave of the Commercial Section of the Pacific Coast Electrical Association to be held at the Casa del Rey Hotel, Santa Cruz, Calif., Nov. 12-13, 1926.

The Commercial Section at this meeting will adopt a new policy for such meetings in that one general session with several outstanding speakers will be held in addition to the many committee meetings. It is planned to make the coming meeting the largest in the history of the section, and an open invitation to all members of the industry interested in commercial subjects has been issued. At the present time it is planned to hold the general meeting on the afternoon of Friday, Nov. 12. The program is in charge of H. K. Griffin, Western States Gas & Electric Company, section chairman.

the Middle and South Forks of the Stanislaus River. After enlargement the project will have an installed capacity of 19,000 hp.

The California Railroad Commission has granted a certificate to the company and to the Pacific Gas and Electric Company, lessee, authorizing enlargement of the Spring Gap power plant at a cost of \$1,950,000. Under the proposed plans the output of the plant will be increased to 55,000,000 kw-hr. per year.

## File for Power on Wind River for Industrial Uses

Filings for 600 sec.-ft. of the flow of Wind River, a tributary to the Columbia River in the Cascade Range along the southern border of Washington for a \$250,000 power plant have been placed with the state hydraulic office, by W. H. Hufford, of Stevenson, Wash.

The plant would have, it is proposed, an output of 10,000 continuous electrical horsepower, although actual construction work would not be undertaken for one year. The point of diversion would be approximately eight miles northeast of Stevenson, Wash., and the appropriated water would be conducted in a 4,600-ft. pipe line to the power house. The necessary dam would be of concrete, steel, reinforced 150 ft. along the top, with other measurements given as 40 and 60 ft.

Such of the output not required for manufacturing by the operating plant would be sold to private consumers, according to a limitation included in the application.

## Enlargement of Big Meadows Dam Is Nearing Completion

The enlargement of Big Meadows dam in Plumas County, Calif., at a cost of nearly \$2,000,000, creating the immense Lake Almanor reservoir of the Great Western Power Company of California, is nearing completion rapidly. Less than 150,000 cu.yd. of hydraulic fill, remains to be placed in the main body of the dam and this, together with riprapping the upstream face of the structure, is expected to be finished by December. The run-off from a 500-sq.-mi. watershed is to be stored behind the new dam this winter.

Work has been actively under way at Big Meadows for the past eighteen months, and a large force of men steadily has been building up the new dam which will increase the storage capacity of the reservoir from 300,000 to 1,300,000 acre-ft. The old dam is being raised from a height of 90 ft. above stream bed to 135 ft.; its thickness extended from 470 ft. to 1,200 ft. and its length increased from 600 ft. to 1,270 ft. The enlarged dam will flood 47 sq.mi.

With the immense storage capacity of the enlarged Lake Almanor, the Great Western Power Company's electric project on the North Fork of the Feather River has a potential development of 1,000,000 hp. Two plants, Caribou and Las Plumas, are now in operation with a combined capacity of 175,000 hp., and eventually eight more plants will be constructed at strategic points, using the stored waters of Lake Almanor over and over again at various heads.

## B.C. Paper Company Adds Million Dollar Equipment to Plant

New hydroelectric equipment amounting to \$1,000,000 has been added to the power plant of the Powell River Company. This company, started as a power company at Powell River on the Straits of Malaspina, 75 miles north of Vancouver, B. C., some fourteen years ago and later changed into a pulp and paper factory, on Oct. 6 put into operation new units with a capacity of 200 tons of newsprint per day. The cost of these units which bring the rated capacity of the plant up to 450 tons per day, is set at \$8,000,000.

The complete electric plant now consists of one 12,000-kva., two 3,750-kva., and two 2,800-kva. generators driven by water turbines and an auxiliary plant of two 1,200-kva. generators driven by steam turbines, for use during periods of water shortage. The current from the auxiliary plant is transmitted to the main hydroelectric station for distribution. The current from the main plant is transmitted to the mill at 2,200 volts and is stepped down at different points to the requirements of the several individual motors that are distributed throughout the plant. Besides hydroelectric power, 26,000 hp. is developed by a series of Pelton wheels that are geared directly to pulp grinders.

The Hon. T. D. Pattullo, minister of lands for British Columbia, threw in the switch that put the new units into operation in the presence of the lieutenant-governor and a large assembly of prominent business and political men of the Province, who were the guests of the president, Dr. D. F. Brooks.

## World Power Conference Stimulus to Power Development

The quantity and the effectiveness of power development is certain to increase as a result of the meetings held under the auspices of the World Power Conference, in the opinion of O. C. Merrill, secretary of the Federal Power Commission. Mr. Merrill, chairman of the American committee and American member of the international executive committee, recently returned from the second meeting of the organization held at Basle, Switzerland, Aug. 31-Sept. 8. It was attended by some 700 representatives from 38 different countries.

In a statement made upon his return Mr. Merrill said in part:

The program of the Basle meeting covered five main topics: Utilization of Water Power, and Inland Navigation; Exchange of Electrical Energy Between Countries; The Economic Relation Between Electrical Energy Produced Hydraulically and Electrical Energy Produced Thermally; Conditions Under Which the Two Systems Can Work Together with Advantage; Electricity in Agriculture; and Railway Electrification, under each of which papers were presented by some member of the American committee. More than 100 papers in all were submitted from the various countries. No papers were read in full at the meetings, but the abstracts of the special subject under discussion were presented by reporters, and general discussion followed. The sessions were well attended, there was great interest in and active discussion of the various subjects, and altogether the conference was a pronounced success.

The meeting at Basle this year, supplementing the meeting at London in 1924, has demonstrated the value of such gatherings and the desirability of making the conference a permanent factor in international relations. The exchange of information and the opportunity to study and compare the methods employed by various countries, have given added stimulus to power development and have already been reflected in the steps taken by several countries to increase the quantity and improve the efficiency of their power developments.

## New Street-Lighting System Put in Effect in San Diego

The first unit of a new street lighting system in San Diego, Calif., on Broadway from Third Street to Eighth, recently was put in operation. The standards are number 1944 Union Metal, with a 20-ft. mounting height, two Form 9-8 panel lantern type units and 10,000-lumen lamps on each. This gives 600 lumens per linear foot of street and compares very favorably with the best lighted streets in America. Westinghouse safety coils are used and are so arranged that 15,000-lumen lamps can be used when desired.

When the second unit is installed the street will be lighted with the new type of illumination from the extreme lower end of Broadway in the downtown city proper to the entrance avenues to San Diego from the north.

The new system replaces five-light cluster lamp-posts which had been in use for many years.

## Farmers Protest Taking of Water for Cushman Final Unit

A group of forty farmers and ranchers living in the valley of the South Fork of the Skokomish River in the Hoods Canal district of the state appeared recently before R. K. Tiffany, state hydraulic supervisor, to protest against the proposed move of the city of Tacoma in taking 600 sec.-ft. of water from the stream for the final unit of the \$6,000,000 Lake Cushman power project.

The water, they pointed out, would not be returned to the South Fork of

the stream but would be conducted by a conduit four miles under a mountain to the present power house of that portion of the project recently placed in operation, with the result that the area of approximately 3,000 acres below the proposed point of diversion would be left barren and worthless.

The answer of Commissioner Ira S. Davisson and J. L. Stannard, chief engineer of the Cushman project, appearing for the city of Tacoma, was that numerous small streams tributary to the South Fork of the stream below the proposed point of diversion would serve to preserve the moisture of the area and to preclude possibilities of its being necessary to put in expensive irrigation systems.

Decision on the matter was reserved by Mr. Tiffany until he could make a personal trip of inspection over the area which would be affected by the proposed diversion of the water.

## Membership in Utility Employees' Insurance Fund Doubled

On Aug. 31 of this year the number of employees who are members of the Employees' Mutual Life Insurance Fund of the Los Angeles Gas and Electric Corporation was exactly twice what it was in June, 1921, when the organization was started.

The membership in the Insurance Fund is purely voluntary and is open to all employees under the age of 50 at the time of application who have successfully passed the usual company medical examination and are in good health. The corporation assists the fund to the extent of bearing all operating costs, so that a beneficiary receives the entire proceeds of the assessment of a dollar levied upon the occasion of the death of any member.

To date a total of 57 death claims have been paid by the Insurance Fund since the time of its inception. This has entailed a total disbursement of \$83,489, or an average payment to beneficiaries of \$1,464.72. The cost per thousand dollars of protection is now approximately \$5.25.

That the organization has been growing rapidly during the past five years is evidenced by the following figures:

June 20, 1921.....	952 members
June 20, 1922.....	1,082 "
June 20, 1923.....	1,214 "
June 20, 1924.....	1,416 "
June 20, 1925.....	1,711 "
June 20, 1926.....	1,837 "
Aug. 31, 1926.....	1,904 "

## Coast Firm Takes Over Companies in Spokane and Butte

Announcement has been made by the Fobes Supply Company, which now operates stores in Portland, Seattle, San Francisco and Oakland, that on Oct. 1 it bought the Washington Electric Company, Spokane, and the Montana Electric Company, Butte. The two companies have been owned since their inception, about twenty-three and eighteen years ago, respectively by H. W. Turner, now retired and living at Carmel, Calif.

H. L. Bargion, for many years manager of the two companies, will remain in that position, and their names of course will be changed to that of Fobes Supply Company.

F. N. Averill is president of the Fobes Supply Company with headquarters in Portland.

## Book Reviews

### ELECTRICAL MACHINE DESIGN

By Alexander Gray, Whit. Sch., M. Sc., Professor of Electrical Engineering, Cornell University, Author of Principles and Practices of Electrical Engineering. Revised by P. M. Lincoln, Director of the School of Electrical Engineering, Cornell University. Second edition, 1926. 523 pages; 339 illustrations; numerous tables. 6x9 in. Cloth-bound. Published by McGraw-Hill Book Co., Inc., New York City. Price \$5.

Like many other works of this nature the subject matter of this book has been developed from an original form compiled as a course of lectures on electrical machine design. The first edition of this work appeared in September, 1912, while the revision bears the date of August, 1926.

The book is divided into four main subdivisions comprising a total of 43 chapters. These major subdivisions deal with d.c. machinery, alternators and synchronous motors, polyphase induction motors, and transformers. The several chapters included in each of the subdivisions deal with important phases of the problem. In each case the treatment is based upon the fundamental principles involved. The text contains data that the author found of particular use in his several years as a designer of electrical apparatus. In the belief of the author study of design is of the utmost importance to all electrical engineering students and only by such study can a knowledge of the limitations of electrical machines be acquired. The text is built upon this fundamental premise and should be of value to students of engineering design.

The revised edition contains all of the fundamental discussions originally included by the author and in addition a modification of the example machines discussed in the text and a modification of the curves, tables, illustrations and other data, bringing them up to present-day practice. G.R.H.

**Lighting Service Manual—Serial Report** of the lighting service committee, 1926-1927, Commercial National Section, N.E.L.A. In the introduction it is explained that, inasmuch as the committee was formed for the purpose of aiding electric service companies in promoting their lighting service activities, it was felt that the preparation of a manual for lighting service departments should be the first step in the committee's program. The manual is designed to give information concerning the proper organization and operation of such a department. The manual, when complete, will consist of the following sections, the first five of which are published in the report just issued: 1. The Lighting Field; 2. Organization; 3. Activities; 4. Equipment; 5. Engineering; 6. Sales Aids; 7. Campaigns; 8. Records and Reports. The report also contains Appendix A, Use of Standard Paragraphs, and Appendix B, Foot-Candle Tables. Price 55 cents; to members 35 cents; quantity prices for 10 or more on request.



## News Briefs

**Steady Progress Being Made on Pit 4 Project.**—Work on the Pacific Gas and Electric Company's Pit 4 power plant is going forward steadily, with 250 men on the job. The temporary diversion dam and flume were completed some time ago. Excavation for the foundations of the permanent dam now is finished, and a considerable portion of the base has been concreted. Pouring of concrete in the section in the river bed will be the next step.

**Power Project Planned for Merced River in California.**—A proposed hydroelectric power project to develop 13,750 hp. is revealed by the filing with the California Division of Water Rights of an application for permission to divert 2,000 sec.-ft. of water from the Merced River in Mariposa County, Calif. Plans include construction of a dam 80 ft. high, 1,000 ft. long at the crest and 200 ft. at the base. The application was filed by Daniel McFarland of Storrie, and the estimated cost is set at \$400,000.

**Studies Municipal Plants.**—Prof. W. C. Duvall, head of the department of electrical engineering at the University of Colorado, spent the summer studying municipally owned power plants in Colorado and western Nebraska. This was the second summer that he has been engaged in similar work, acting for the Utilities Information Bureau of Denver. His surveys include an inspection and study of all phases of the operations affected. As a result of his work in 1925, several municipal properties were purchased by the Public Service Company of Colorado.

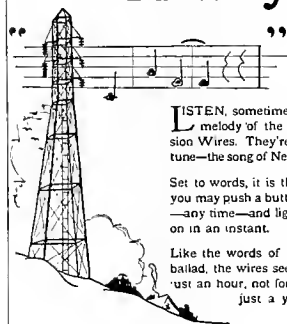
**Hearing Held in Los Angeles to Determine Compensation for Recently Acquired Electric Distribution Systems.** A hearing to determine the compensation to be paid by the city of Los Angeles for certain electric distributing systems acquired from the Southern California Edison Company was held in Los Angeles Sept. 27-Oct. 1, inclusive. At this hearing evidence was presented concerning tangible values only of the property involved. The hearing will be continued Nov. 2. The properties affected are all in the territories which recently have been annexed to the city of Los Angeles.

**Federal Power Commission Exacts from Los Angeles County Flood Control District Stipulation Covering Future Development.**—If the Los Angeles County Flood Control District will execute a stipulation covering the possible future development of power by the district, or by others with its consent, in connection with its proposed flood-control project on San Gabriel River, the Federal Power Commission will grant the necessary rights-of-way coming within its jurisdiction. At a meeting of the commission on Aug. 19 the commission took the view that the proposed use of the reservoir for the main purpose of flood control and irrigation is consistent with the most beneficial development of water resources and committed itself to grant the right-of-way under the condition mentioned.

**Liberty Bell Monument at Sesquicentennial Exposition Has 25,000 Lamps.**—The Liberty Bell monument which spans the main entrance to the Sesquicentennial Exposition in Philadelphia contains 25,000 Mazda lamps. The illumination of the monument was designed and created by the Westinghouse Lamp Company.

**Report on Two Utility Companies of Utah Filed.**—Report of the Western States Utilities Company of Morgan, Utah, covering nine months' operations of the Morgan Electric Light & Power Company and three months' operations of the Western State Utilities Company in 1925, recently was filed with the Public Utilities Commission of

## Always Singing: "Always"



LISTEN, sometime, to the humming melody of the Electric Transmission Wires. They're singing a popular tune—the song of Never-Failing Service.

Set to words, it is the music that says you may push a button or turn a switch—any time—and light or power comes on in an instant.

Like the words of that popular song—ballad, the wires seem to say, "Not for just an hour, not for just a day, not for just a year—but always"



**Public Service Company  
OF COLORADO**

Capitalizing upon a popular song, E. K. Hartzell of the advertising and public relations department of the Public Service Company of Colorado, grasped the opportunity to direct the attention of the public to the continuity of service rendered by that company. The advertisement recently occupied a 3-column, 8-in. space in a number of Colorado newspapers.

**Utah.** Total operating revenues for the two organizations for the year are listed at \$16,338.04, with total operating expenses of \$10,695.24. The operating income is listed at \$5,250.16.

**Mount Spokane Power Company Expands.**—Completion of new penstocks 375 ft. long for the Mount Spokane Power Company at its generating station north of Spokane, Wash., and the erection of a new concrete power house, have been announced by M. F. Mendenhall, president. A new transmission line into Clover Valley also has been constructed this summer. The company has expanded to serve ten towns of the eastern Washington district, and reports an increase of 60 per cent in power sold and 113 per cent in merchandise.

**More Hetch Hetchy Contracts Let.**—Contracts totaling more than \$2,000,000 have been let by the Board of Public Works of San Francisco for tunnel work in connection with the Hetch Hetchy water supply project. The A. Guthrie Company of Portland, Ore., was awarded a contract for the construction of the Rock River and Oakdale sections of tunnel for \$1,257,952 and T. E. Connelly and J. M. de Lucca of San Francisco were awarded the contract for the Brown section of the tunnel for \$779,745.

**Japan Proposes 220-kv. Transmission Network.**—Proposals have been made in Japan that a 300-mile trunk transmission line operating at 220-kv. be constructed between the cities of Osaka and Fukushima on the Island of Nippon, according to the Japanese technical press. The line would be so constructed as to connect all of the large hydroelectric generating and distributing companies in the densely populated area between Tokyo and Osaka as well as the province of Fukushima to the north of the former city where considerable energy is generated.

**Panama Canal Commission Awards Contract for Engines for Oil-Electric Tugs.**—The Panama Canal Commission has awarded a contract to the Ingersoll-Rand Company for four 480-hp., 6-cylinder, 15 x 20, solid injection marine oil engines for installation in two oil-electric tugs which soon are to be built at the Balboa shops for service on the Panama Canal. One of these will be assigned to the marine division on the Pacific Coast for towing large vessels into and out of the entrance to the canal. The other tug will be used by the dredging division for servicing the dredging operations in the various parts of the canal.

**Cafeteria Installed by Utility for Employees.**—The Los Angeles Gas and Electric Corporation is completing the installation of a modern cafeteria on the twelfth floor of its main office building in Los Angeles. The new cafeteria will be completely equipped with every facility for the serving of plain and fancy food, which will be provided at as low prices as possible. The kitchen will have a hotel range, modern refrigeration plant, electric dishwasher and all other necessary equipment to make it complete in every way. The new cafeteria, while chiefly for the convenience and accommodation of employees in the main offices of the company, will be open to all employees in every department as well.

**Power Possibilities of Shuswap River in British Columbia Surveyed.**—A survey of the Shuswap River power possibilities recently was made by Clifford Planche, a hydroelectric engineer of Montreal with a view to the erection of a plant to supply power and light to towns and farms in the Okanogan district of British Columbia. The Okanogan Valley is in the dry belt, having an annual rainfall of about 10 in. The main object of the power plant, if erected, would be to supply power to farms, in order that water may be pumped for irrigation. The Montreal Trust Company is behind the venture.

**Southern California Utility Passes 100,000 Mark.**—The San Diego Consolidated Gas & Electric Company has passed an important milestone in its progress, having acquired 100,000 gas and electric customers, according to W. F. Raber, vice-president and general manager. On Jan. 1, 1926, the company was serving 96,620 gas and electric customers. Now it is serving 101,839 customers.

**East Kootenay Company Plans New Steam Plant.**—The East Kootenay Power & Light Company of Fernie, B. C., is planning the erection of a steam plant at Crow's Nest Lake. The company has hydro plants at Bull River and Elko Falls rated at 22,000 hp., and 40,000 hp. more is said to be available.

# Pacific Coast Electrical Association

## P.C.E.A. Committee Personnel for 1926-27 Announced

Internal organization of the various sections, committees and subcommittees is practically completed. Honors again go to the Engineering Section for the earliest and most complete organization. The Commercial Section plans to complete its organization at meetings to be held early in November. Listings of the Commercial Section committees therefore are held over for a subsequent issue of the Journal.

Committee personnel as released by the offices of the secretary of the association Oct. 15 is as follows:

### GENERAL OFFICERS

S. Waldo Coleman, Pres., Coast Co. G. & E. Co.  
W. L. Frost, 1st V.-P., So. Cal. Ed. Co.  
P. M. Downing, 2nd V.-Pres., P. G. and E. Co.  
J. F. Pollard, Treas., Coast Val. G. & E. Co.  
S. H. Taylor, Sec., 447 Sutter St., San Francisco

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E. R. Northmore, L. A. G. & E. Corp.  
G. A. Peers, Coast Valleys G. & E. Co.  
Z. T. Pettit, L. A. G. & E. Corp.  
A. C. Putnam, So. Sierras Pwr. Co.  
J. G. Rollow, L. A. G. & E. Corp.  
R. C. Smith, Glendale P. S. Dept.  
Vinton Smith, Std. Underground Cable Co.  
E. R. Stauffacher, So. Cal. Ed. Co.  
P. Suransky, P. G. and E. Co.

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T. P. McCrea, L. A. G. & E. Corp.

H. R. Peckham, S. D. Cons. G. & E. Co.  
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L. A. Reynolds, Grt. Western Pwr. Co.

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S. W. Coleman, Coast Counties G. & E. Co.  
W. E. Creed, P. G. and E. Co.  
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A. B. Day, L. A. G. & E. Corp.  
Miss J. F. Emans, So. Cal. Ed. Co.  
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A. E. Hitchner, Westinghouse E. & M. Co.  
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R. E. Smith, So. Cal. Ed. Co.

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C. R. Eccles, Western States G. & E. Co., vice-chairman.  
W. DeWaard, S. D. Cons. G. & E. Co.  
J. L. Gray, So. Cal. Ed. Co.  
F. F. Henry, So. Cal. Ed. Co.  
S. E. Hickman, S. J. L. & P. Corp.  
J. H. Hunt, P. G. and E. Co.  
C. A. Kelley, So. Sierras Pwr. Co.  
C. B. Lore, So. Sierras Pwr. Co.  
W. Maddock, L. A. G. & E. Corp.  
D. P. Mason, S. J. L. & P. Corp.  
W. J. McCullough, So. Cal. Ed. Co.  
H. O. McKee, So. Cal. Ed. Co.  
G. C. Robb, P. G. and E. Co.  
F. R. Sherwood, Grt. Western Pwr. Co.  
F. W. Smith, Grt. Western Pwr. Co.  
R. E. Thompson, S. D. Cons. G. & E. Co.  
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**TRANSPORTATION SECTION**

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P. H. Ducker, So. Cal. Ed. Co., vice-chairman.  
J. M. Wainscoat, S. J. L. & P. Corp., secretary.

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D. P. Mason, S. J. L. & P. Corp.  
C. D. Weiss, S. D. Cons. G. & E. Co.  
E. C. Wood, P. G. and E. Co.

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W. M. Fairbanks, So. Cal. Tel. Co.  
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**Power Devices Subcommittee**

P. H. Ducker, So. Cal. Ed. Co.  
G. A. Peers, Coast Valleys G. & E. Co.  
W. J. Schaeffer, L. A. G. & E. Corp.  
A. E. Strong, Coast Counties G. & E. Co.

**Records and Accounting Subcommittee**

J. S. Moulton, S. J. L. & P. Corp.  
J. E. Kelley, Western States G. & E. Co.  
**Shop Tools and Equipment Subcommittee**  
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C. H. Gray, So. Sierras Pwr. Co.  
L. A. Savage, S. D. Cons. G. & E. Co.

**Special Problems Subcommittee**

J. M. Wainscoat, S. J. L. & P. Corp.  
D. P. Mason, S. J. L. & P. Corp.

**Vehicle Design Subcommittee**

E. C. Wood, P. G. and E. Co.  
O. R. Cole, P. T. & T. Co.

**Meeting of Executive Committee, P.C.E.A., Called.**—An important meeting of the executive committee of the Pacific Coast Electrical Association has been called for Nov. 19 at 2 p.m., to be held in the office of the secretary, 447 Sutter Street, San Francisco.



## News of the Electragists



### Ben Hill Goes East on Article Five Committee Conference

To go into the revision of article five of the National Electric Code, a meeting of the article five committee was called for Oct. 16, at Atlantic City. Ben Hill, supervising inspector, city of Oakland, Calif., and president of the California Association of Electrical Inspectors, went as the California representative of that committee.

On leaving Mr. Hill commented on the proposed work of the article five committee in seeking to establish a more complete and detailed code which could be used to reduce the number of local requirements to a minimum and practically do away with the necessity for other than the national code.

"I appreciate the responsibility that has been given me as representative of the men in the West," said Mr. Hill, "and I want to assure everyone that I shall go to the meeting to uphold high standards and to establish as a true national standard the National Electrical Code. There shall be no tearing down."

Mr. Hill said that the committee planned to make a careful study, section by section, of the article, make its recommendations to the committee on code revision and then submit for approval.

Upon the completion of the code revision, Mr. Hill declared he was in favor of a much greater educational program to acquaint all interested in the provisions of the code. A man should be selected, in his opinion, to study the code and its interpretations, and take it up in each community for the benefit of all.

Article five is the article on wiring methods, it was pointed out, and the purpose of the present conference is to amplify article five to incorporate

in it the "shall and shall not" necessary to give it authority.

"One of the finest things about the arrangements for my going," said Mr. Hill, "is that no one of the organizations contributing to my trip has



B. C. HILL

asked me to pledge myself to any sort of program. I have been left to exercise my discretion and to act according to the standards which are highest."

Other members of the article five committee called by W. J. Canada, electrical field secretary for the National Fire Protection Association, chairman of the committee, are Victor H. Towsley, Chicago; L. W. Going, Portland, Ore.; and M. Cannady, inspection department of North Carolina.

Ward Akeley, Inc., well known Long Beach and southern California contractors, have opened offices in Los Angeles at 829 Petroleum Securities Building. Thomas Hutton is in charge of the Los Angeles office.

### Northwest Inspectors Announce Convention Date Change

Announcement has come from F. D. Webber, secretary of the Northwest Association of Electrical Inspectors, that a mistake has been made in announcing the dates for the next meeting of the association. The meeting will be held Jan. 17 and 18, rather than 18 and 19, as previously announced. This will make the convention run on Monday and Tuesday of that week.

The convention is to be held at the Multnomah Hotel, Portland, Ore.

Clarence Elder, of Elder Bros. Electric Company, Salt Lake City, returned recently from an extended trip through the Northwest.

D. D. Sturgeon, Electragist of Denver, and family recently returned to the city after a two weeks' automobile trip to Wyoming.

L. H. Rohrer of the Valley Electric Company, Lompoc, spent several days in Los Angeles on business about the first of the month.

The Home Electric Company, formerly at 23rd and Coast Boulevard, Newport Beach, Calif., has moved into a new store at 112 Coast Boulevard.

The Mission Electric Company of Santa Barbara, Sandy Vahrenkamp, proprietor, has recently been made a member of the California Electragists, Southern Division.

S. Beck, from the Central Supply Company, Denver, and part owner of the United Electric Supply Company, was in Salt Lake for about two weeks during the absence of H. R. Bygel who was away on vacation.

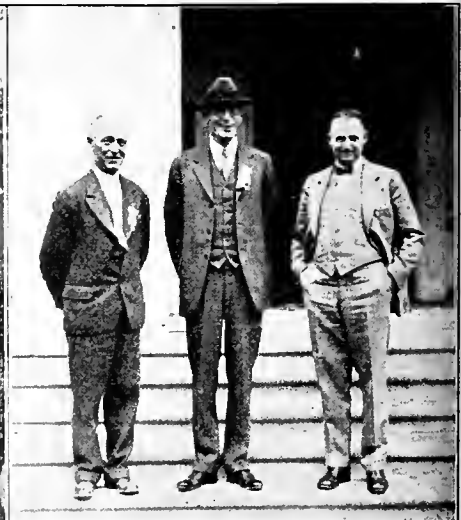
The McGeary Electric Company, Santa Barbara, has just moved into its new and beautifully equipped electrical store on State Street. This firm has occupied temporary quarters since its former store was wrecked in the earthquake.



The Three Graces—but who's the gentleman? Mrs. Fagan, Mrs. Joseph Fowler, and Mrs. Harry Walker—not to mention Fred Buzzell, of course.



Look like brothers, and are as far as merchandising goes. O. N. Robertson of Santa Ana, and "Kelly" Courtright of Fresno. Their paper started things.



Now you tell one! What chance has the motor man, H. S. (Mike) Jones, between two Electragists, Frank McGinley, of Wilmington, and Earl Browne, San Francisco.



Meetings

Agriculture's Future and Light  
Topic of U. C. Man's Talk

"The future of American agriculture lies in the lap of the contented and satisfying rural home."

With this statement as his theme, J. P. Fairbank, extension specialist in agricultural engineering, University of California farm school, Davis, explained to the Illuminating Engineering Society at a recent meeting the work of the University Extension Division in carrying the message of good lighting to farm communities.

Since half of the farms in California are served with electricity, the extension division felt it was worth while to give attention to electric lighting on farms, and as a result a demonstration unit, on a portable basis (Journal of Electricity, Jan. 1, 1925, p. 12), carried the practical ideas of good lighting to 150 communities in 32 counties last year. Besides group demonstrations, home demonstrations were made with kitchen-lighting equipment. The kitchen was chosen as the logical place to start a better home-lighting educational campaign. The demand has spread for information regarding lighting of other rooms of the farm home as well.

"Now people are asking us, 'Where can I get such equipment?' and 'How much does it cost?'," said Mr. Fairbank. "We cannot answer that. But the answer to those questions will be what the lighting industry makes it."

"The trouble with home lighting as I see it," Mr. Fairbank continued, "is that lighting fixtures are sold on a millinery basis rather than a sound economical or engineering basis. By millinery basis I mean that the emphasis is placed on its appeal to the eye, to style, and the desire of ownership and nothing to utility."

"We need more lighting units for the home designed for beauty because of their simplicity, produced on a production basis instead of custom built so that the cost of good lighting can be reduced to a popular level."

The kitchen-lighting campaign, it was pointed out, was a step in that direction but not far reaching enough. The same kind of campaign was needed for other rooms of the house.

"It will be better for everyone concerned when you can sell three \$10 fixtures to a farm home rather than one \$30 luminaire that may or may not 'lumen'."

In concluding his talk Mr. Fairbank declared that rural homes wanted good lighting, that they were ready to pay a reasonable price for it, and that they looked to the Illuminating Society for help in getting it for them. Mr. Fairbank had set up his demonstration apparatus and described briefly the means he took to carry his story to his audiences.

**Radio Trade Association Elects Officers.**—At the recent annual meeting of the Pacific Radio Trade Association in San Francisco, Ernest Ingold, president of Ernest Ingold, Inc., was elected

president of the association for the coming year. Mark E. Smith was elected vice-president and W. J. Aschenbrenner secretary-treasurer. The balance of the board of directors includes E. J. Koepke, J. A. Ramsey, Wilbur Jackson, Major Nathan Levinson, E. A. Portal, Robert Eastman and H. W. Dickow.

Sacramento Valley Electrical  
Society Holds Meeting

At the first meeting of its fall season held by the Sacramento Valley Electrical Society in Sacramento there were sixty-five members of the society present. After the usual banquet an address was delivered by F. W. Bunyon, steel metallurgist of the Southern

COMING EVENTS

- Pacific Coast Electrical Association—  
Commercial Section—General Conclave  
Casa del Rey Hotel, Santa Cruz, Calif.  
Nov. 12-13, 1926
- Meeting of Executive Committee  
Office of Secretary, 447 Sutter Street,  
San Francisco  
Nov. 19, 1926, at 2 p.m.
- Purchasing and Stores Section Meeting  
San Francisco, Dec. 2-3, 1926
- Advertising-Publicity Section—  
Quarterly Meeting  
Edison Buildings, Los Angeles  
Dec. 3, 1926
- Northwest Association of Electrical Inspectors—  
Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 17-18, 1927
- Pacific Division, Electrical Supply Jobbers' Association—  
Quarterly Meeting—Hotel Del Monte,  
Del Monte, Calif.  
Jan. 27-29, 1927

Pacific Company, on the "The Electric Treatment of Steel." He covered, briefly, the history of the treatment of metals from their earliest use to the electric treatment of today, and made an interesting comparison between open-hearth and electric furnaces as to qualities, costs and material handled. Then followed a tour through the Southern Pacific Company's machine shops and to the 6-ton electric furnace, which was timed so that a "pour" of steel might be witnessed.

Nominations for office were made as follows: President, J. O. Tobey, division superintendent electric department Pacific Gas and Electric Company; secretary, C. S. King, engineer, Great Western Power Company; treasurer, F. P. Bruner, Pacific Gas and Electric Company; directors (1926-1928), H. E. Brillhart, Great Western Power Company; R. J. Finchley, California Mechanical & Electrical Engineering Company; George C. Foss, contractor. Prof. B. D. Moses, of the University of California; Earl Hart, of the Pacific Gas and Electric Company; and M. P. Canon, of Latourrette-Fical Company, as directors hold office for another year.

**Plans Electrical Course at Washington University.**—The Electric Club of Seattle has under serious consideration the establishment of an electrical course at the University of Washington; also a school for lighting, sponsored by the club.

Committee Chairmen of Seattle  
Electric Club Appointed

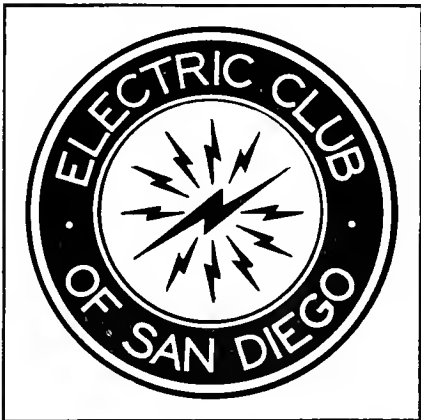
The following committee chairmen have been appointed by J. D. Ross, president of the Electric Club of Seattle, to serve during the coming year, each chairman to name four committeemen to serve with him:

Finance, J. J. Hayes, Westinghouse Electric & Manufacturing Company; legislative, Sam G. Hepler, Arrow Electric Company; wiring code, J. G. Maitland, Electric Engineering Corporation; membership, Harry J. Martin, National Carbon Company; entertainment, Robert Clark, Puget Sound Power & Light Company; publicity and advertising, Joe Osier, Seattle Journal of Commerce.

**Red Seal Meeting at Devonshire.**—Under the auspices of the Peninsula Electric Development League a group of 65 electrical contractors, power-company representatives, architects and builders were told the Red Seal story, accompanied with the new "before and after" demonstration, at a meeting held at the Devonshire Country Club, San Carlos, Calif., recently. Ray Turnbull, Edison Electric Appliance Company, was the principal speaker, talking on merchandising opportunities under the Red Seal plan. Victor Hartley, California Electrical Bureau, was in charge of the Red Seal demonstration.

San Diego Electric Club Adopts  
Appropriate Emblem

The Electric Club of San Diego, Calif., recently adopted the club button shown in the accompanying illustration. For some time the matter of an appropriate emblem has been under consideration and many attractive designs have been submitted. The sketch offered by Ray C. Cavell, president of the club, finally was chosen because of its simple and appropriate design. Several of the emblems suggested, while attractive, were not considered representative of all phases



This lapel button, recently adopted by the San Diego Electric Club as its emblem, has a blue center field surrounded by a black border with the lettering in gold.

of the industry represented by various members of the club. The buttons will be lapel style, three-eighths of an inch in diameter, solid gold, with black field in border and blue field in center. All lettering will be in gold.

## Personals

Clyde L. Chamblin, president, California Electrical Construction Company, San Francisco, is the newly elected president of the California Electragists. Prominent for many years in the Electragist branch of the industry, Mr. Chamblin brings to his new position a wide knowledge of that branch's affairs, an understanding of its problems, and a long experience in the contracting business that should be of great benefit to the organization. For the year 1925-1926 he represented the Electragists as a member at large on the executive committee of the National Electric Light Association. Other important posts that he



CLYDE L. CHAMBLIN

has held include that of member of the executive committee of the Association of Electragists, International, director of the Society for Electrical Development, Inc., president of the California Association of Electrical Contractors and Dealers, president of the San Francisco Association of Electrical Contractors and Dealers and member of its executive committee, president of the San Francisco Electrical Development League, and member of the executive committee of the Pacific Coast Electrical Association. At the present time he is serving on the advisory committee of the California Electrical Bureau. With a leader of Mr. Chamblin's qualifications, his familiarity with the affairs not only of the Electragist branch but of the industry as a whole, and his wide acquaintance, great progress should be made by the California Electragists during the coming year.

Merrill C. Morrow, formerly assistant to the general manager of the merchandising department of the Westinghouse Electric & Manufacturing Company, has been appointed assistant sales manager of the same department. In his former position Mr. Morrow was responsible for sales to public utilities. His work now embraces all the activities of the merchandising department. His headquarters will be at the company's plant at Mansfield, Ohio.

Ernest L. Dee, of the Edison Lamp Works, Salt Lake City, not long ago made a business trip through Idaho, Portland, Seattle, Spokane and the Northwest.

C. B. Hawley, of the Intermountain Electric Company, and J. A. Kahn, of the Capitol Electric Company, both of Salt Lake City, attended the electrical jobbers' convention, Pacific Coast Division, at Victoria, B. C., in September. They were successful in taking home several cups as a result of their good golf playing.

Roscoe F. Oakes, vice-president and general manager, National Carbon Company, San Francisco, accompanied by Mrs. Oakes, recently spent a month in the Northwest. While in that section he attended the Pacific Coast convention of the Electrical Supply Jobbers Association in Victoria, B. C., and also paid a visit to Seattle.

A. H. Noyes, formerly with the Electric Appliance Company and later with the Westinghouse Electric & Manufacturing Company, both of San Francisco, has joined the staff of Dunham, Carrigan & Hayden in that city as salesman of its electrical lines. He will cover the territory adjacent to San Jose, Calif.

Harold Pomeroy, of J. G. Pomeroy & Company, manufacturers' representatives of Los Angeles, recently left for the East to visit the various factories which that firm represents.

William Wheat, manager of the North Coast Electric Company, Portland, spent two weeks in Seattle not long ago.

E. S. Conrad, Pacific Coast sales manager, Square D Company, San Francisco, spent a week in Seattle a short time ago.

Joseph A. Fowler, president of the Association of Electragists International, was the principal speaker at a recent banquet given in his honor jointly by members of the Electrical League of Colorado and the Denver Electrical Contractors Association. P. Harry Byrne, president of the local contractors' association, presided over the meeting and presented the only other speaker, A. C. Cornell, league chairman, who spoke briefly on league activities.

C. W. Sward, sales engineer, G. & W. Electric Specialty Company, Chicago, recently spent several days in San Francisco while on a trip through the Pacific Coast states on business.

H. B. Squires, for many years president of the H. B. Squires Company, San Francisco, has sold his entire stockholdings in the firm to S. P. Russell, who has been his partner for a number of years, and terminated his connection with the company Oct. 31. The firm name will remain the same.

D. G. Kendall has been made a member of the board of directors of Brown & Pengilly, Inc., San Francisco, and placed in charge of engineering and sales of the company's northern California division.

H. S. Jones, manager, Robbins & Myers, Inc., San Francisco, has been appointed chairman of the program committee of the Electrical Development League, succeeding W. B. ("Doc") Francis, who is leaving the electrical industry to become sales manager of the Ti-T Machines Company, with headquarters in San Francisco.

H. A. Laidlaw, of the engineering division of the Pacific Gas and Electric Company, employed a unique means of transportation to the P.C.E.A. Engineering Section meeting in Los Angeles in September, traveling there on board one of the ships of the Pacific battle fleet.

Elmer Ambrose Sperry of the Sperry Gyroscope Company, New York, has been awarded the John Fritz gold medal in recognition of his development of the gyroscopic compass and his application of the gyroscope to the stabilization of ships and aeroplanes.

F. M. Feiker, operating vice-president of the Society for Electrical Development, with headquarters in New York, has been appointed by Herbert Hoover, Secretary of Commerce, as a member of the new advisory committee which will co-operate with the domestic commerce division of the United States Department of Commerce.

J. J. Hannemann, district representative in Kansas City for the National Lamp Works of the General Electric Company, has been transferred to the Mountain states territory with headquarters in Denver.

H. L. Duncan, formerly station chief at the Southern California Edison Company's Big Cheek No. 1 plant, has been transferred to the company's main offices in Los Angeles in the department of work orders and budgets. Eric Sismey, formerly assistant station chief at Big Creek No. 3, succeeds Mr. Duncan.

A. J. Priest, attorney and secretary of the Idaho Power Company at Boise, Idaho, has severed his professional connection with that company and become associated with the legal department of Electric Bond & Share Company in New York. Matriculating at the University of Idaho in the fall of 1914, Mr. Priest gained his B. A. degree, in advance of graduation, in April, 1918, to enlist in the service, becoming sergeant-instructor at Camp Lewis, Wash., and later going to the



A. J. PRIEST

officers' training camp at Camp Grant, Ill. Having had considerable experience in newspaper work, at the close of war he re-engaged in it until the fall of 1919, when he took the course of law at the University of Idaho and was graduated with honors in June, 1921. He was editor of the university paper, graduate manager of athletics, and a member of Beta Theta Pi, later serving as district chief for a number of years. He resumed his newspaper work for a time and later engaged in the private practice of law, associated with C. C. Cavanah in Boise, and afterward with John F. MacLane in Salt Lake City, Utah, whence he went to the Idaho Power Company in January, 1923. Mr. Priest's active abilities have led him into many branches of public service, to which he has given freely

of his time and energy, as he is intensely interested in all movements for the betterment of surrounding conditions.

**Paul S. Clapp**, formerly special assistant to Herbert Hoover, Secretary of Commerce, in engineering, economic and commercial problems of the United States, has been appointed managing director of the National Electric Light Association. He succeeds M. H. Aylesworth, who recently resigned to become president of the newly organized National Broadcasting Company, Inc. Mr. Clapp has had an interesting career. Graduated from Iowa State College in 1913 with the degree of B.S. in electrical engineering, he entered the Chicago factory of the Western Electric Company to familiarize himself with factory methods. In February, 1914, he was advanced to the same company's engineering department in New York, remaining there until February, 1917. During that period he assisted in the research work being carried on in connection with trials of the vacuum tube as an oscillator and amplifier. In February, 1917, Mr. Clapp became assistant purchasing agent of the Allied Machinery Corporation, remaining until September of the same year, when he was commissioned a first lieutenant in the U.S.A. Signal Corps and became division signal supply officer of the Thirty-third Division, Camp Logan, Texas. Later, in charge of the field trial and responsible for the final engineering approval of all radio and telegraph apparatus for aeroplanes, tanks and field sets at the radio laboratories at Little Silver, N. J., Mr. Clapp won promotion to a captaincy in



PAUL S. CLAPP

the signal corps. He was sent to France, and among other activities there he served on the Peace Commission in Paris as a member of the committee for the determination of damage in allied countries, became affiliated with the American Relief Administration for central and southeastern Europe, assisted in re-establishing cordial relations in the business interchange of American and western European industries, and under the American Relief Administration supervised a feeding area in Russia containing 470,000 adults and children. Concluding his work with the relief administration in February, 1923, Mr. Clapp traveled in Scandinavia and central Europe and then in Berlin to study languages, customs and conditions. In that year also he was awarded the degree of electrical engineer by Iowa State College.

**William M. Green**, engineer in charge of the investigation of the Great Basin reclamation project in Utah, on behalf of the U. S. Reclamation Service, has resigned from the service to accept a position with the J. G. White Engineering Corporation in Mexico. This firm is engaged in reclamation work for the Mexican government and private interests.

**A. L. Alin** of San Francisco has joined the engineering department of The Washington Water Power Company at Spokane. He was formerly with the Foundation Company of New York.

**E. T. Hunter**, salesman at the Hood River office of the Pacific Power & Light Company for the past year and a half, has resigned to take charge of the electric department of the Kelley Hardware Company.

**Edward H. Cheney**, who has been Chicago district manager for the Wagner Electric Corporation, St. Louis, since 1909, has been made sales manager of the company in the latter city, succeeding **Thomas T. Richards**, resigned.

**W. C. Sterne**, president, the Municipal Properties Investing Company, Denver, and president of the Rocky Mountain Division, N.E.L.A., recently returned from a business trip to the Pacific Coast.

**W. F. Raber**, vice-president and general manager, San Diego Consolidated Gas & Electric Company, was a visitor to San Francisco recently.

**L. W. Brownrigg**, formerly special representative in Cleveland for the Electric Vacuum Cleaner Company, Inc., of that city, has been appointed division manager for that company in San Francisco. Prior to his connection with the Electric company, Mr. Brownrigg was associated with the National Carbon Company.

**F. J. Cram**, formerly secretary and assistant manager, Electric Appliance Company, San Francisco, made a trip to Olympia, Wash., recently.

**A. H. Kahn** has been appointed assistant district manager of the San Francisco office of the Pacific States Electric Company, succeeding **Roy Worth** who is no longer associated with the company.

**Lawrence T. Fay**, president Fay Rubber Products Company, Elyria, Ohio, lately visited the Pacific Coast on business.

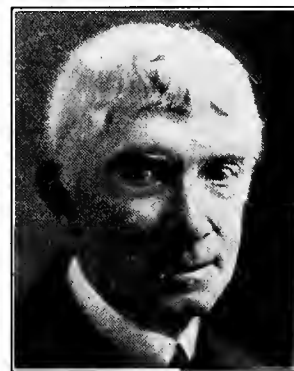
**C. R. Breck** and **R. R. Day**, engineers representing the J. G. White Engineering Corporation of New York, have been making a survey of the water power possibilities of Falls River, near Prince Rupert, B. C., and of some of the tributaries of the Skeena River, in northern British Columbia. About a year ago, **Lorne A. Campbell**, general manager for the West Kootenay Power Company, made a survey of Falls River.

**W. J. Dodge**, since 1923 telephone and telegraph engineer with the California Railroad Commission and for five years prior to that assistant engineer in the gas and electric division of the commission's engineering department, has resigned to become commercial engineer for the Pacific Telephone & Telegraph Company.

**Howard Wright**, formerly in the claims department of the Puget Sound Power & Light Company, Seattle, has been named safety engineer for the company's southwestern district, succeeding the late **Capt. D. J. Kinzie**.

## Obituary

**Charles Heston Peirson**, assistant vice-president of the Southern California Edison Company, who for eighteen years has had charge of publicity for that organization, died at his home in Los Angeles Oct. 19 from heart failure. "Charlie" Peirson known throughout America as a veteran newspaper man, was born in Batavia, Genesee County, N. Y., March 2, 1859, and began writing for the local weekly paper when he was 12 years old, at the same time serving as messenger boy for the Western Union Telegraph Company. After graduating as a telegraph operator he worked as a re-



CHARLES HESTON PEIRSON

porter for the Buffalo Courier and the Buffalo Times. Answering the call of the metropolis, he joined the staff of the New York Morning Journal. In 1890 he went to work in the New York office of the Associated Press. In the latter capacity he was sent to Havana at the outbreak of the Spanish-American War. He later went to California where he was engaged by the Los Angeles Herald, at that time a morning paper. When the Examiner was started he was made circulation manager. In 1909 Mr. Peirson began his association with the Southern California Edison Company to which he gave all his talent and energy until he was stricken with the illness which resulted in his death. Much of the widespread knowledge of the electrical industry is due to "Charlie" Peirson's facile pen. It was he who made the Florence Lake Tunnel an international story and Jerry's dog team a household phrase. As a free lance writer he contributed both poetry and prose to literary magazines throughout the country. His best known poem is "The New White Coal" also used as a prologue to the well known film of the same title.

**Charles A. Porter**, substation operator who had been in the employ of the Utah Power & Light Company, Salt Lake City, and its predecessors for the past thirty years, died Sept. 3.

**Capt. David J. Kinzie**, for the past several years safety engineer for the Puget Sound Power & Light Company, Seattle, in its southwestern district, died Sept. 5.

## TRADE NOTES

The Timken Roller Bearing Company, Canton, Ohio, has issued a new Timken Engineering Journal, a loose-leaf book of 110 pages containing technical information relative to the application of Timken bearings to automotive and industrial machinery. Typical problems and their solutions, tables, methods of mounting bearings, a full set of dimension sheets accurately drawn to scale, together with formulas and recommendations for application of Timken bearings are among the subjects treated in the book. Copies may be had upon request.

The Ben Franklin Electric Company, Seattle, Wash., has opened a new store at 1503 Third Avenue, its second store opened since last December. R. B. Condon is the local manager.

Wodack Electric Tool Corporation, 23-27 South Jefferson Street, Chicago, has announced its electric hand saw, which weighs but 24 lb., is fitted with a motor large enough to drive an 11-in. circular saw, and still can be operated from the ordinary light socket. The company claims that with its electric hand saw a 4x4 timber can be cut in less than two seconds.

Standard Electric Stove Company, Toledo, manufacturer of Standard electric ranges for domestic use, heavy-duty ranges, hotplates, griddles, cookers, water heaters and coffee urns, has purchased the 3½-acre site at the corner of Oakwood, Hawthorne and New York Central Railway, Toledo. The property will be cleared at once and the erection of a modern factory building begun, according to the company's announcement. The first unit of this building will about double the company's present capacity and is expected to be occupied early in the spring.

Frank Hodson, consulting engineer, Philadelphia, formerly founder and president of the Electric Furnace Construction Company, Philadelphia, advises that he has signed contracts with F. T. Kaelin of Montreal for the exclusive rights to Mr. Kaelin's system, process and patents on the Kaelin electric steam boiler for the United States and South America. Mr. Hodson originally introduced this boiler into the United States for the Electric Furnace Construction Company before it was taken over by the General Furnace Company. The total number of Kaelin electric steam generators now installed is over 500,000 kw., and with the growing development of hydroelectric power their scope and usefulness is constantly increasing, according to the announcement.

Jas. R. Kearney Corporation, manufacturer of overhead and underground utility equipment, 4224-32 Clayton Avenue, St. Louis, Mo., recently has issued a bulletin catalog. The corporation is a new organization and this is its first catalog. Bulletins contained in the catalog cover anchors, plug cut-outs, service connectors for light and power service taps, guy wire clips, dead-end eyes, and extension sleeve twisters. A complete catalog or single bulletins as specified may be obtained upon request.

The Washer Wilson, Inc., distributors of electrical appliances, has opened offices in Seattle, with Russell Brooks as manager. This is the seventy-fifth branch of the firm, which features Horton Gyrator Washer and Horton Automatic Ironer.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued "Regulators for Generator-Voltage Control," S. P. 1734, a well illustrated booklet covering the following subjects: Regulators for Direct-Current Generators; Vibrating-Type Regulators for Alternating-Current Generators; The Application of D. C. Generators to Exciter Service; Compensation for Voltage Drop and Parallel Operation of Regulators; Rheostatic-Type Regulators for Alternating-Current Generators; Extended Broad-Range Regulators, and Special Regulator Applications.

Square D Company, Detroit, has issued catalog No. 32 which lists not only the company's complete line of industrial switches but includes standardized meter service switches, convertible power panels and electrical porcelain. The book is in loose-leaf form, profusely illustrated and carefully indexed.

Crouse-Hinds Company, Syracuse, N. Y., has issued a broadside on its vapor-proof Condulets, covering its V series, hand lantern and hand lamp, FS, FA, GS, ZT, YW, YKW series and type WV.

"When good fellows get together"—Living picture to illustrate that rollicking old song posed by those good fellows (left to right) H. L. Pinkerton, new business manager, Albuquerque Gas & Electric Company, Albuquerque, N. M.; B. C. J. Wheatlake, manager, General Electric Company, Salt Lake City; G. W. Thomas, power salesman, Public Service Company, Denver; and K. W. Kissick, manager, Deming Ice & Electric Company, Deming, N. M. Note the unstudied pose of the gentlemen at either end and the characteristic golf attitude of the pair in the center.



The Packard Electric Company, Warren, Ohio, recently has issued a leaflet covering its outdoor metering cabinets. These cabinets were developed to go with the company's line of weatherproof metering transformers where it is not convenient or advisable to place meters indoors.

Aladdin Manufacturing Company, Muncie, Ind., manufacturer of desk lights, table lamps, floor lamps, bridge lamps, and similar equipment, has issued an attractive catalog containing many new items of interest to the trade. Copies will be supplied by the company upon request.

The Appleton Electric Company, 1701-13 Wellington Avenue, Chicago, has under construction a new concrete addition to its plant, which will contain 100,000 sq.ft. of floor space and is being built immediately adjoining its present building. The new building will give the company much needed additional floor space required to take care of the rapidly increasing business both in the electrical and automotive field, according to the announcement.

Pittsburgh Transformer Company, Pittsburgh, has prepared Bulletin 2058, "The Largest Self-Cooled Transformers Shipped Complete in the History of the Electrical Industry." This folder describes the 15,000-kva. Pittsburgh polyphase transformers shipped to the New York Edison Company for its East River station.

The Falk Corporation, Milwaukee, Wis., is making a flexible coupling of entirely new design, different from anything it has manufactured previously, according to recent announcement. The construction is very simple, it is claimed, and provides for disconnection of shafts coupled, without disturbing either machine, and alignment is reduced to the simplest operation, demanding only a short straight edge and an ordinary set of feelers. The couplings are made in standard sizes from ⅓ hp. to 30,000 hp. at 100 r.p.m. Bulletins may be obtained from the company upon request.

Roller-Smith Company, New York, has issued Bulletin 550 covering its new Type SR line of relays. They supersede the company's old Imperial Type relays and have many marked advantages over the old type, according to the company. The scales are longer, the accuracy is much greater, the torque has been increased several times and the new 7½-in. round pattern style of case matches Type SA and Type SD lines of indicating instruments. Complete technical details are given in the bulletin.

J. H. Bunnell & Company, Inc., has announced the removal of its factory to new and larger quarters at Pearl and Prospect Streets, Brooklyn, N. Y. The main office and warehouse will remain at 32 Park Place, New York City.



# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

## Now - a five year guarantee

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### MAJESTIC

#### Electric Hot Cake and Waffle Iron

In quality of materials and workmanship, in sparkling beauty, in practical performance, the MAJESTIC has always been the leader in its field. Now we have added a feature that puts

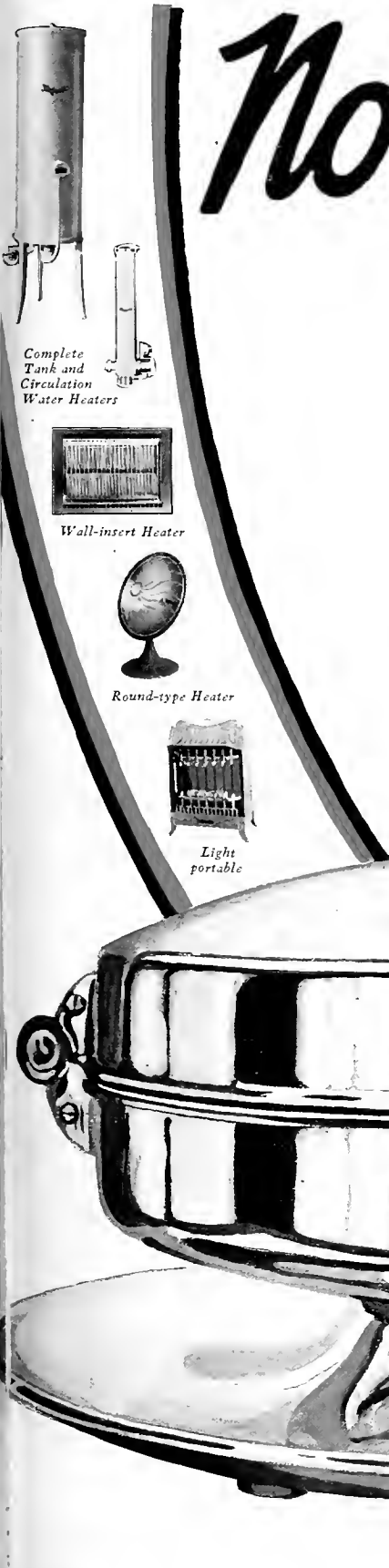
MAJESTIC another long step ahead of all competitors. A heating element with a five year guarantee means greater satisfaction for the customer—more sales and more profits for the dealer.

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Light portable

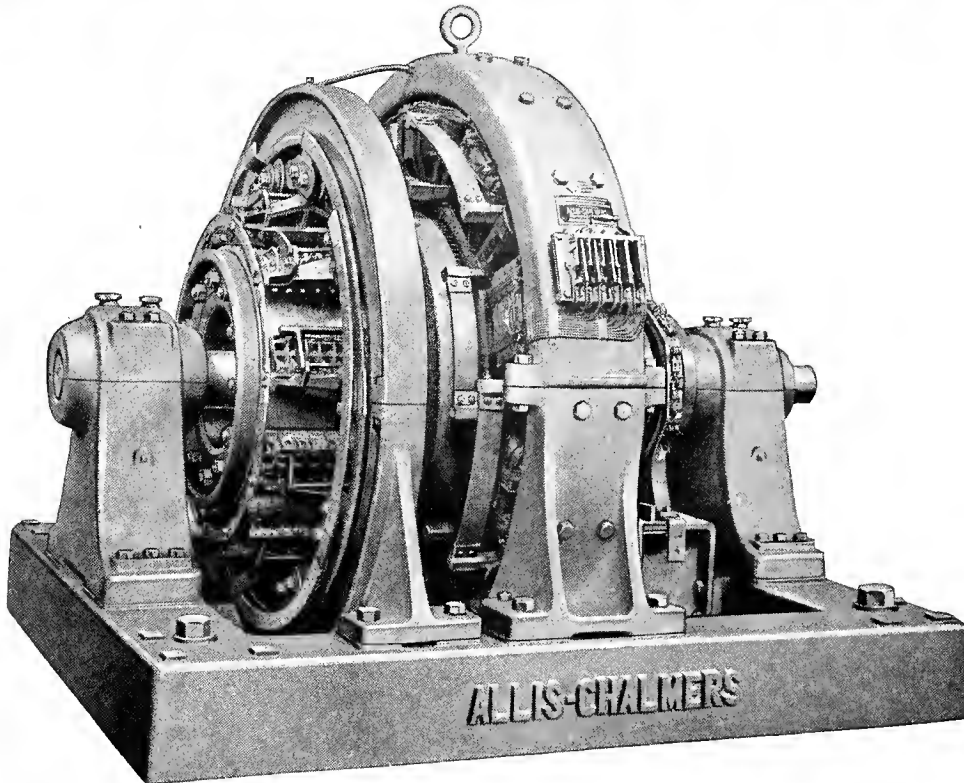


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**MILWAUKEE, WIS. U.S.A.**

# Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."  
Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES

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## 220-kv. Transmission Takes to the Air

ANOTHER transmission record has fallen before the steady advancement of the art of high-tension transmission. The mere establishment of a new record is not as noteworthy as is the fact that the record is but a by-product of the economic considerations entering into the planning and execution of a modern power system.

In this issue may be found a series of articles covering the economics and general system problems, the electrical design features, the structural design, and the construction methods involved in the dual river crossing spans of the Pacific Gas and Electric Company's latest addition to its 220-kv. transmission system. These discussions have been prepared by the men most intimately engaged with the details of this project. They give not only information of interest to the transmission engineer, but also give an insight into some of the many problems met with in the expansion and correlation of the various units of a power system that has grown from many and widely separated small beginnings.

At first glance it may seem that an unwonted amount of space has been devoted to this one enterprise. However, second thought surely will establish the value and usefulness of such articles not only for the immediate interest, but also to provide for future reference, an historical record of Western engineering developments. In an effort to furnish its readers with such authentic reference material the Journal of Electricity's editorial staff traveled more than 7,000 miles per man during the first nine months of 1926.

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*Dura Bill*



# EDITORIAL

## Futility or Fruition—Which?

**Y**EAR after year the same old story comes to the fore—that the most fundamentally vital sections of the Pacific Coast Electrical Association are the last to effect and perfect a working organization. This condition is the fault of no one individual or any single group of individuals, but is the result of lack of system.

Economics demands that this lethargic condition be rectified by wiping the slate entirely clean and starting over again with a thoroughly reorganized personnel and vision cleared of cobwebs. A year is all too short a time for a committee or a section to accomplish the important work that will justify the continuance of its existence. To fore-shorten this meager period by regularly eating up half of it in building a working organization is costly in the extreme to the industry. A better example of a desirable situation could not be given than to refer to the organization of the Engineering Section wherein committee and section work is carried on upon a basis of complete continuity, the close of a fiscal year witnessing committees already re-organized and "ready to go."

## Voters Reject Water and Power Acts in California and Oregon

**L**ITTLE Red Riding Hood has outwitted the wolf again. Voters in both California and Oregon overwhelmingly repudiated at the November elections the radical attempt to place the operation of the light and power industry in the hands of the politicians. The famous California Water and Power Act has taken its third crushing defeat. Similarly the hopes of the few proponents of the Housewives' Bill in Oregon were exploded with a loud bang.

The campaign for and against the Water and Power Act in California was not marked by the feverish efforts extended by both parties in 1922 nor by the quiet determination which characterized the election in 1924. Nevertheless none of the voters were fooled, for at present indications it appears that the majority against the measure will exceed 350,000 even though the total vote this year was lighter than in the two previous elections. The ratio against the measure probably will exceed two and a half to one as against two and three-tenths to one in 1924. In the face of three such overpowering defeats it does not seem probable that the proponents of this act will have the courage to initiate it a fourth time.

In Oregon the expression against socialization of industry as represented by the vote against the

Housewives' Bill was even more marked. Indications are that this measure went down to a four-to-one defeat, cities and rural districts alike adding to the total by which the bill was snowed under. The electrical industry of Oregon waged an unostentatious but forceful campaign of public education which seems to have borne fruit. However, there is a feeling in the state that many advocates of government ownership voted against the Housewives' Bill because it was so objectionable. If the proponents of state-owned water and power agree upon a less drastic measure it is likely that such legislation will be introduced again at a later date.

In face of returns from the two elections it appears that the public is thoroughly satisfied with the present system for the supply of electric energy. And why should this not be so? In the face of rising costs of living and startlingly increasing costs of government, the cost of electric energy is cheaper today than it ever has been in the history of the industry.

## Making the Young Engineer of More Value to His Employer

**I**F every employer knew how each of his employees felt about the particular job to which he had been assigned there would be little reason for personnel departments and certainly less labor turnover, using labor in this sense to apply to all manpower. In the electric light and power business a high percentage of the young men who are expected ultimately to fill the gaps in the executive staffs are drawn from the ranks of young engineering graduates. It is refreshing to know what one of these young men thinks of his job, his prospects and those of any young man in a similar position in one of the central stations. In a recent issue of one of our contemporaries such a young man sets down his feelings after four years with the particular company with which he is associated. In one place he says:

Employers are principally interested in students who rank among the first 40 per cent of the class, based on grades and general standing in college. The lower 60 per cent gradually drift into other fields or fill routine, mediocre positions in engineering or allied work. As an exception to this general statement it is worth while to mention the extremely bookish impractical type who makes high grades but who must be eliminated from this consideration.

Of the 40 per cent, the industry is very much concerned with the more capable ones who have such active minds and good personality that they can readily adapt themselves to work in allied fields, not specifically engineering, which pay more. Financial investigation and engineering salesmanship are occupations that have drawn heavily on this group. The large company employs picked students whom they consider the very best available and then often make the training course so long and the promotion so slow that a large number of the most capable and more energetic boys go into other fields and are thus lost to the industry to which they could be of most value.

It is certain that this industry is not so well supplied with promising young men that it can afford to let such a condition pass unnoticed. Frequently executives have been heard to complain that they had a good job open but that they could not find a man in their organization capable of filling it. In some cases one needs but examine closely the men already in semi-executive positions to see that weakness has resulted from letting good men be drawn into more promising fields.

Conceivably the solution lies in dropping the popular opinion that a young college graduate must pass through an unproductive and unremunerative period of from five to ten years before he can be given a position of responsibility. Instead the young man should be given responsible work where he may not only earn a higher salary but may get the experience which will make him better fitted for the next step in the ladder of promotion.

### Merchandise for Your Share of the Christmas Dollar

CHRISTMAS, so the saying goes, comes but once a year. This has become a recognized business principle for some time. If sales during the year have not been what they might have been—there's always Christmas coming. Even as to the child Christmas means an extraordinarily happy time, to the merchandiser Christmas means more sales volume and prosperity.

This expectation on the part of the merchandiser is based on good grounds. The holiday season is set apart in the average family life as a season of festivity and gifts. The family budget is squeezed for ten months of the year so that a surplus may be available for spending then. Even the banks have caught the idea implied and provided easy means of saving Christmas gift funds.

Competition for this Christmas stocking, the stocking this time into which the pennies of the year have been deposited, is keen, however. No sane merchandiser is content to trust to luck that he will share in the Christmas buying the public will indulge in these days. There are too many other merchandisers willing to show the Christmas buyer why he should spend his entire allowance on some particular article of trade. It is true that a certain prosperity may be expected as a result of natural conditions, but the electrical merchandiser who is wise will not sit and wait for these conditions to lay prosperity in his lap.

For several years the slogan, "Make this an Electrical Christmas," has been sung. Each year it brings more and more results. To those who preach that gospel this year, not necessarily in exactly the same words, but at least in effect, will come rewards based upon the accumulated advertising built up through these previous Christmas campaigns.

It is no time to slacken the merchandising effort. If a concerted Christmas campaign was successful last year, a better one this year surely will result in still greater sales. If a first rate merchandising plan in selling electrical appliances was helpful last year, such a plan this year should bring even

greater rewards. If windows decorated for Christmas drew shoppers inside last year, better windows this season will attract more than ever. The Journal in its Better Merchandising section in this issue offers constructive suggestions along these lines. But from whatever source the merchandiser gets his inspiration, this Christmas season's activity should be redoubled. In like proportion will his sales increase and his own Christmas stocking be filled.

### Professor Ripley Turns the Spotlight on the Utilities

ARMED with a bright spotlight and a sharp and sometimes censorious pen, Prof. William Z. Ripley has brought forth his highly anticipated article on public utilities. If any of the operating companies feared indictment, then whatever shivering in their boots they may have done has not been justified for Professor Ripley in his article, "More Light! And Power, Too," confines his attention exclusively to the holding companies. Virtues and vices, advantages and defects and a certain amount of dirty linen are given a thorough airing. It is impossible in this short space to do more than comment on some of Professor Ripley's conclusions and at the same time heartily to recommend to our readers a careful study of the article.

In the first place, the present situation with respect to holding companies can be blamed in no small measure upon the diversity and inadequacy of state laws pertaining to corporations. On this subject Professor Ripley says, "Utility managements are no less to blame for this over-extended situation than are the people of the United States. Corporations are oftentimes compelled by the diversity of state laws to resort to these artificial arrangements—albeit perhaps not without a modicum of quiet satisfaction that our conflicts of laws are so baldly permissive of profitable indirection." Certainly the electric light and power industry will heartily endorse Professor Ripley's suggestion that these state laws be both modified and standardized.

His suggestions with reference to the weaknesses in regulation brought to light by the growth of holding companies are open to considerable discussion. He says, "The impotence of state administrative agencies in the face of the growth of these great combinations is indubitable. . . . Matters of finance and accounting seem likely to play a larger part than those of rates in controversies of this sort. Over these the Federal Power Commission at the present time may take jurisdiction in those cases only where no competent state regulation obtains. But, even then, authority is limited specifically to electrical service generated by water power. It would be a relatively simple matter to enlarge the scope of this administrative body, by conferring plenary jurisdiction over all interstate matters, whether or not there were an existing state agency, and by authorizing it to deal with electric service however generated, by steam as well as by water power."

Professor Ripley's recommendation for federal regulation will not meet with favor from the utili-

ties. Undoubtedly he has not read Secretary Hoover's discussion of this subject presented at the 1925 N.E.L.A. convention. Secretary Hoover at that time said: "It has been proposed that as power districts may be no respectors of state lines, we must have federal regulation of power. I do not agree with the conclusion that federal regulation is necessary. I can see no reason for the imposition of a superior regulation, merely because Congress may have the power to exercise its authority under the commerce clause."

As in previous articles dealing with corporations, Professor Ripley urges fuller and more complete publicity, particularly in annual statements. In making this recommendation he is talking to a group which many years ago recognized the value of publicity. It is safe to say that there is no industry concerning which the public knows so much, due in no small measure to the efforts of the light and power companies themselves to shine the light of public knowledge upon even their innermost workings.

It is Professor Ripley's final conclusion, with which we must disagree. He asserts that much information is needed before reform can come about. But the method he suggests for securing this information! He says: "The surest source of disinterested illumination would be a comprehensive examination into the whole subject of public utilities preferably under the authority of the Federal Power Commission or some other special board temporarily created for the purpose. Consequently a wise policy to follow at this juncture would seem to be to refrain—ostentatiously, as it were—from advocacy of any particular program; but to urge instead that the President recommend to the Congress that provision be made for such an exhaustive inquiry, to be so prosecuted as to command the confidence of the entire country. . . ."

"A searching inquiry by real experts, stripped of all political bias and affording a field day for all comers; an open contest in which the truth, regardless of self-interest, shall prevail—this is the downright need of the moment. . . ."

How fine! How splendid! A congressional investigation "stripped of all political bias!" "A field day for all comers," including the radical press and the socialistic advocates of government ownership. Rather, if it followed the usual course of such investigations, it would develop into a political muck-raking contest in which the good would be smeared with the mud from the bad. Neither Professor Ripley nor anyone else in this country can promise a congressional investigation "stripped of all political bias."

Secretary Hoover, to quote him a second time, has said of the electric light and power industry: "We are in the midst of a great transformation in the development of electric power—it amounts almost to an industrial revolution, for it bears upon its wings the most profound advance of American industry in a generation." It is conceivable that in the course of this transformation and reconstruction some of the evils which Professor Ripley credits to the industry have developed. But he

himself admits that many of the companies are taking steps to correct the situations which have grown out of expansions and consolidations. Is it not equally possible that ultimately all may be corrected without legislation and without investigations? The experience of the electric light and power industry to date has been that if left alone, unhampered by political meddling, it will rectify its own mistakes. Its record in its comparatively short life shows that, since its inception, rates have gone down; service has become better, and that public confidence in its operations has increased.

#### Wherein Statistics Leave the Best Part of the Story Untold

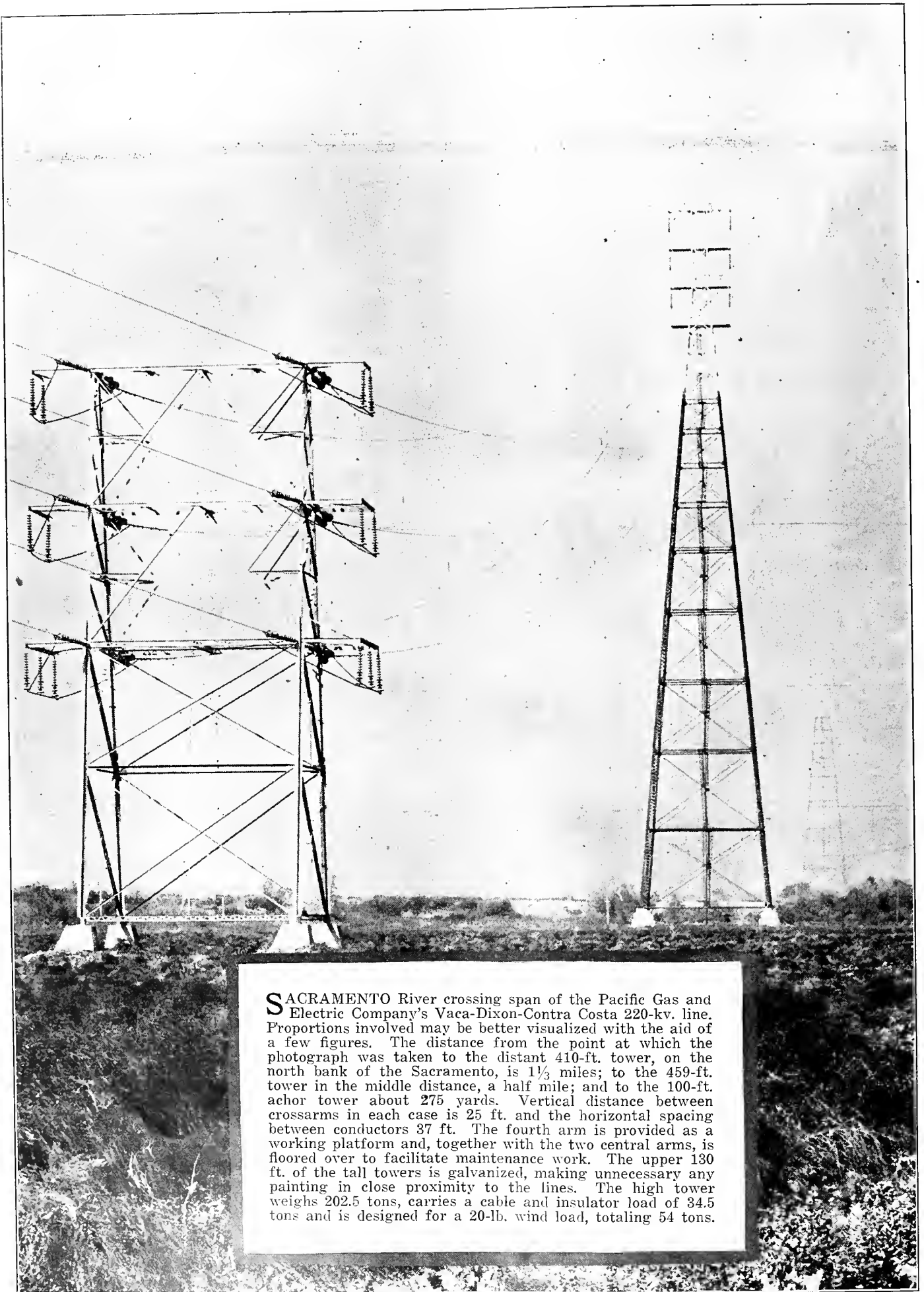
**O**FTENTIMES discouraging are the actual figures as to the number of Red Seal homes recorded, viewed in proportion to the effort being expended to further this plan. The organizations supporting the effort are tempted, no doubt, to demand more results from the expenditures in time and money necessitated by the operation of the promotion set-up.

It is rather a pity that the entire results accruing from this sales effort on the part of the Red Seal organization cannot be tabulated in full. These effects resulting from the Red Seal cause would show a much more promising outlook for the final outcome of the campaign.

There are, for instance, in one tract of new homes, fourteen Red Seal homes actually under construction. These figures are all that actually may be seen by those supporting the plan. However, to the field man these represent but the beginning of a project which will result in 110 Red Seal homes—a rather more favorable story. This is typical of many similar cases.

Moreover, although numerous homes have been built reflecting Red Seal standards, many of them, because of the omission of perhaps a single outlet in the dining room, where two are called for, have not been awarded a Red Seal certificate and therefore cannot be counted in the summary of work accomplished. To all intents and purposes these homes, adequately wired in practically every other respect, are Red Seal homes in effect if not in fact. At least the purpose motivating the Red Seal plan, that of providing possibilities for greater domestic load, is being satisfied in such homes.

It is too early to pass judgment on the efficacy of the Red Seal plan. It is yet in the stage of development in which it must overcome initial inertia. When the body of home-building once starts moving toward the Red Seal idea—and it is beginning to budge in that direction at present—the gathering impetus of that movement will bring forth the rewards which sometimes seem so remote today. The convenience outlet campaign which preceded the Red Seal plan today is bringing home the results hoped for originally and doing so now under its own momentum. Will not the Red Seal plan prove to be similarly successful in the long run, if our patience remains with us?



**S**ACRAMENTO River crossing span of the Pacific Gas and Electric Company's Vaca-Dixon-Contra Costa 220-kv. line. Proportions involved may be better visualized with the aid of a few figures. The distance from the point at which the photograph was taken to the distant 410-ft. tower, on the north bank of the Sacramento, is  $1\frac{1}{3}$  miles; to the 459-ft. tower in the middle distance, a half mile; and to the 100-ft. anchor tower about 275 yards. Vertical distance between crossarms in each case is 25 ft. and the horizontal spacing between conductors 37 ft. The fourth arm is provided as a working platform and, together with the two central arms, is floored over to facilitate maintenance work. The upper 130 ft. of the tall towers is galvanized, making unnecessary any painting in close proximity to the lines. The high tower weighs 202.5 tons, carries a cable and insulator load of 34.5 tons and is designed for a 20-lb. wind load, totaling 54 tons.



# Evolution of a Transmission System

## Growth Necessitates Consideration of Many Different Factors

By A. H. Markwart

Vice-President in Charge of Engineering, Pacific Gas and Electric Company, San Francisco

THE desideratum of transmission throughout California has always been that of routing power in a southerly direction to the markets. This characteristic tendency may be noticed with a glance at a transmission map of the state. The Pacific Gas and Electric Company, in common with others, has had a similar problem, and with the bringing in of the Pit River power the difficulties of a long transmission in the southerly direction were emphasized.

Moreover, that company and its predecessors, to get power to the southern end of its system, were confronted with the necessity of crossing the navigable waterway which separates its distribution territory from Sacramento to the ocean. This feature presented itself with the company's first long distance transmission. There were only three general locations where crossings could be effected, the Golden Gate Strait, the Carquinez Straits and the lower Sacramento-San Joaquin River region above Antioch. In the early days when Martin and De Sabla decided to bring hydroelectric power from the Colgate plant to Oakland, they deemed such a crossing one of the greatest difficulties to be overcome. In 1901 the Bay Counties Power Company, a predecessor, effected an overhead crossing at Carquinez Strait. This was considered a worthy feat and solved one of the major problems which arose in the building of the transmission lines from Colgate to Oakland, a distance of 140 miles.

Of the several crossings among which selection was to be made, that at Carquinez was the shortest and the most direct route to the chosen terminal. The span there is 4,427 ft. between the main towers, the total length from anchorage to anchorage being 6,277 ft. There are three steel towers: North Tower, 225 ft. high, and the Leaning Tower, 84 ft. high, both on the north side of the straits, and South Tower, 60 ft. high on the south side. The transmission voltage then was 60 kv. Originally one circuit and a spare cable, four cables in all, were provided. In 1914 two more cables were added thus providing two circuits.

Perhaps the most important factor in the development of large blocks of power in places re-

**TRANSMISSION towers from 269 ft. to 459 ft. in height have been erected by the Pacific Gas and Electric Company to carry two 220-kv. lines across the San Joaquin and the Sacramento Rivers near Antioch, Calif. In this paper Mr. Markwart discusses the economic and other considerations that led to the selection of this particular means of providing for an increasing delivery of Pit River Power to the Bay region load centers. Interesting features of design and construction are described in other articles appearing in this issue.**

motely situated from the market is the voltage at which the power should be transmitted. When the Pit River development was under investigation the engineers of the company determined the transmission voltage on a purely economic basis, due regard being paid to all of the elements entering into the problem. A voltage of 220 kv. offered the most economic answer.

In the development of a river which would yield as much power as the Pit it became necessary also to give consideration to the size of the power blocks which from time to time

should be brought in to meet the anticipated load requirements. The annual peak-load growth for the system in recent years has been or the order of 25,000 to 30,000 kw., of which it is considered economic to supply roughly three-quarters from new hydro developments. As it takes at least two years to build a Pit River plant one of 50,000 to 60,000 kw. is of suitable capacity at the present time. With the compounding of the growth which is taking place, even larger plants in the future may be completed every two years. The installed capacities on the Pit River are, or will be, approximately as follows:

Hat Creek Nos. 1 and 2 (combined)	25,000 kv.
Pit River No. 1	70,000 kv.
Pit River No. 2	15,000 kv.
Pit River No. 3	81,000 kv.
Pit River No. 4	100,000 kv.
Pit River No. 5 } Future	140,000 kv.
Pit River No. 6 }	51,000 kv.
Ultimate total	482,000 kv.

From the above the peak output will be of the order of 378,000 kw. With this step development of generating facilities a plan for transmission was required which would be susceptible of correspondingly progressive development on an economic basis. Such a plan also had to be comprehensive so that when fully realized it would provide a transmission avenue for all of the power which was expected to be available from the Pit River.

Upon the completion of the Pit River No. 1 and the Hat Creek No. 1 and No. 2 plants, with a combined peak output of 75,000 kw., it was considered necessary to deliver the power from these plants

at a convenient point north of the Sacramento River. This was done in order that it could be routed, initially, over existing lines by way of the Carquinez Straits to Oakland leaving a way open for the routing of the future power further south to a point near the lower end of San Francisco Bay. Various considerations fixed this first terminal on

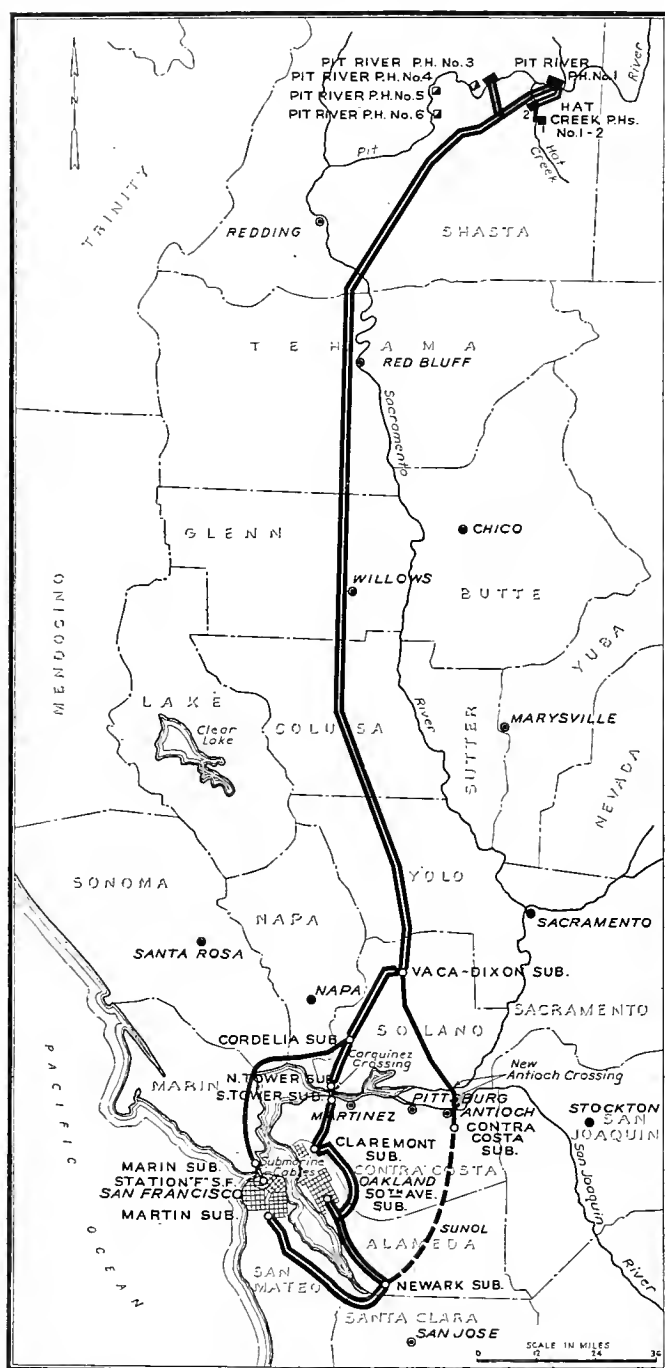


Fig. 1. General map showing relation of Pit River transmission system to San Francisco Bay load centers.

the state highway between the towns of Vacaville and Dixon, and the Vaca-Dixon substation was established to accomplish the purposes mentioned.

#### Reinsulation of Carquinez Crossing

Somewhat concurrently with other major construction the original 60-kv. bay lines crossing the Carquinez Straits were replaced by a double-circuit 110-kv. line which was tied in at Vaca-Dixon thus providing for delivery of a substantial block of Pit

power to Oakland. The crossing at Carquinez was re-insulated for 110-kv. operation and became an important element in the transmission line between the Vaca-Dixon substation and Oakland. (See Fig. 1.) Subsequently the Claremont and 50th Avenue substations in Oakland were connected to Newark by a double circuit 110-kv. line and the older Drum-Cordelia 110-kv. line was looped through Vaca-Dixon substation thereby permitting the Cordelia substation to become an outlet for Vaca-Dixon substation. This permitted the routing of a small block of Pit power to San Francisco by way of the Cordelia-Marin 60-kv. tower line, the Marin substation, and the bay cables across the Golden Gate.

However, with the advent of higher voltages new elements came in for consideration in the selection of a crossing of this water barrier. While the Carquinez region permitted the operation of a voltage of 110 kv. it was deemed unsuited to operation at any considerably higher voltage because of the unfavorable climatic conditions and the prevalence of industrial fumes and gases. The Golden Gate Strait, on the other hand, was eliminated as a crossing by the difficulty attendant upon obtaining permission from Government authorities for an overhead span, together with the presence of fogs detrimental to high-voltage operation. The great number of cables which would have been necessary at the highest cable voltages then considered acceptable likewise precluded a submarine crossing at that point.

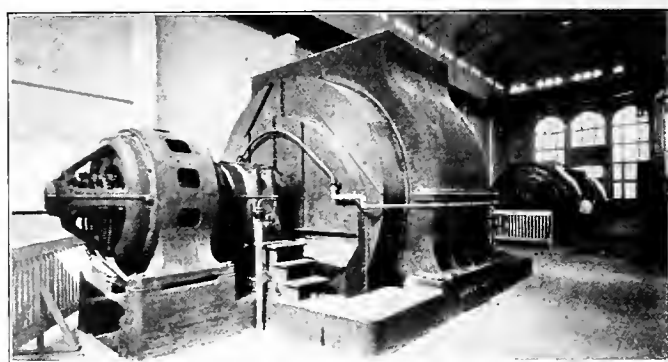


Fig. 2. 80,000-kva. synchronous condenser capacity at Vaca-Dixon substation. The new 40,000-kva. unit is in the background.

The region in the vicinity of Antioch, however, was considered suitable for a crossing and moreover a location thereabouts permitted the whole line to be routed in a southerly direction to the east of Mt. Diablo through a territory where climatic conditions generally are regarded as favorable for operation at voltages considerably higher than those previously employed. Incidentally this route provided trunk transmission widely separated from the lines routed by way of Carquinez.

The broad plan which was adopted contemplates in a general way the routing of the 220-kv. Pit transmission beyond Vaca-Dixon in a southerly direction to a terminus near Sunol with a 110-kv. tie to the existing Newark substation or to a terminus at the Newark substation itself, as may be decided after further study of the problem. Neither the exact location of the terminus nor details of the

line have been determined thus far because it was considered desirable to do this later and in the light of knowledge and experience obtaining after a few years of operation of the line between the Pit River and the Vaca-Dixon substation at 220 kv. However, with the exception of the exact location of the southern terminus of the Pit transmission system the general plan was sufficiently well established to permit orderly progress toward the desired end.

### 110-kv. Belt Line

The proposed southern terminus is in keeping with the plan for supplying the 110-kv. belt line beginning at Claremont and extending around the lower end of the Bay, ending at the new Martin substation near San Francisco. Were this belt line to be fed at the Claremont end only, one double-circuit line would not be sufficient to carry the load. Martin substation is 100 miles distant, by the route named from Vaca-Dixon substation. By also feeding into the belt line at a point near Newark there could be a ready flow of power into San Francisco. Further, the expected growth of industrial load in the Oakland, Alameda and Hayward territory would be served more adequately from the two directions than from one only.

Following the completion of the transmission scheme as far as Vaca-Dixon substation, the next step in the construction was the projection of the line farther south to furnish another outlet from

present installed transformer capacity at Contra Costa substation, would practically treble its capacity and make substantial improvement in operating conditions. Furthermore it was incumbent that any plan to be adopted for the handling of this power should co-ordinate with the general plan tentatively adopted for the ultimate disposal of the entire output from Pit River.

All things considered, it appeared most logical to carry the 220-kv. double-circuit tower line south from Vaca-Dixon across the Sacramento and San

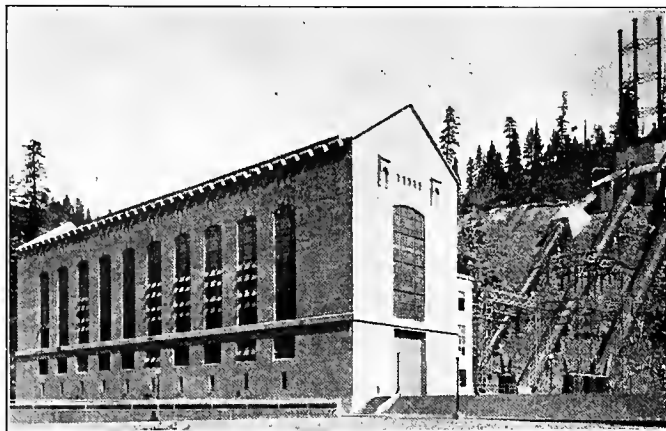


Fig. 4. Pit No. 3, fourth of the Pit string of plants; 81,000-kva.

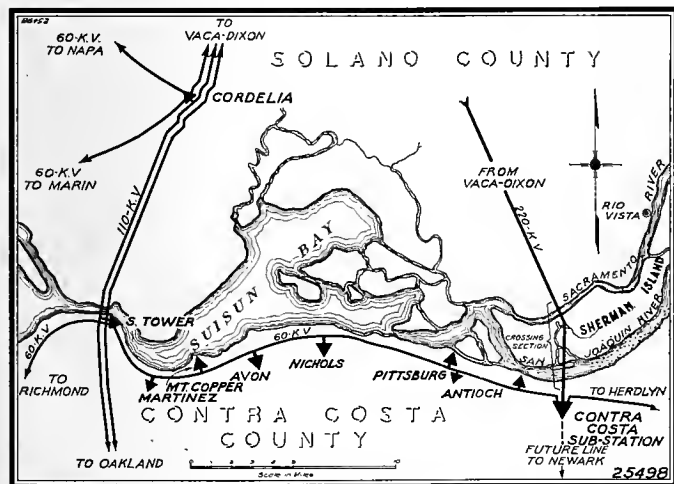


Fig. 3. Map of vicinity of crossing showing relation of local load centers.

Vaca-Dixon for the power which would be incoming upon the completion of Pit River No. 3, an 81,000-kva. development. In properly disposing of this influx of power, consideration was given to a number of related elements. Important among these was the most noticeable growth of load along the industrial littoral on the south side of the confluence of the Sacramento and San Joaquin Rivers and San Francisco Bay between Martinez and Antioch. This area for some time has been served from a 60-kv. line running from South Tower on the Vaca-Dixon-Oakland lines, to Herdlyn on the Electra-Newark line and fed generally from the South Tower end. The introduction of Pit power into this line at approximately its middle point, with the

Joaquin Rivers to a provisional 220-kv. terminus and permanent unloading substation. This led to the establishment of the Contra Costa substation near Antioch. (See Fig. 1.)

This plan had the further advantage of acquiring at once the rights-of-way for the future 220-kv. lines from Vaca-Dixon substation as far south as Antioch, leaving for future determination the exact route and terminus of the lines beyond that point. In addition it created a situation which made it possible to construct 110-kv. lines along the Bay shore to supply such industrial load centers as Antioch, Pittsburgh, Bay Point and Martinez at an earlier date than otherwise would have been possible, should the growth at these points prove to be more rapid than expected. Such a 110-kv. line would prove a highly desirable route for the delivery of power into the Claremont and 50th Avenue high tension substations were it subsequently decided to send some of the power from Vaca-Dixon to these points by other than the present Carquinez route.

With the future development of still other power from the Pit the Vaca-Dixon-Antioch line will be continued further south to a selected permanent terminus as mentioned in the foregoing. Thus, upon completion, the 220-kv. transmission system will permit the routing of power through Vaca-Dixon substation for an appropriate distribution to Oakland and waypoints including Cordelia, and to Newark or thereabouts for San Francisco and the peninsula and for the region in the vicinity of San Jose and southerly therefrom,

For the present and for some time to come the Vaca-Dixon-Antioch line will be operated at 110 kv. It is probable that even upon completion of

the line from Antioch south 110-kv. operation will continue until such a time as additional power from the Pit River is required for Newark and beyond. When such time arrives the voltage will be increased to 220 kv. approximately quadrupling the capacity of the line.

### Future Transmission System

Upon the completion of the Pit River development the transmission system, relating specifically to Pit power, will be so composed of 220-kv. and 110-kv. circuits as to handle the energy adequately.

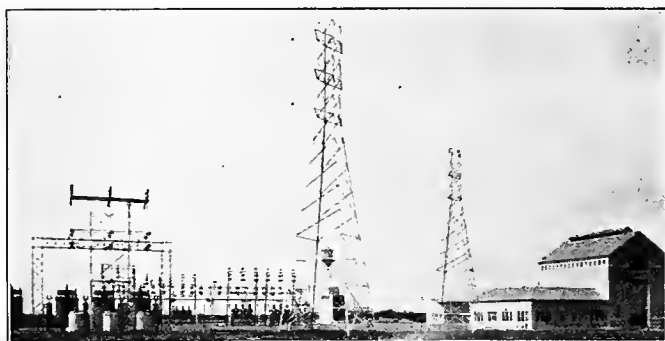


Fig. 5. Recently completed Contra Costa substation, one of the steps in the scheme of an enlarged transmission system.

This system will distribute power from the Pit River through the Vaca-Dixon substation to Cordelia for distribution to the North Bay region and San Francisco, to Claremont substation for distribution in the East Bay region, or to Newark substation en route to the South Bay area and to San Francisco. Thus in effect there is created by this general plan a 110-kv. ring bus supplying Oakland, San Francisco and the Bay region generally. This bus will be fed at both Vaca-Dixon and Newark with hydro power from Pit River and other sources.

At the present time the transformer capacity at Oakland in two substations, Claremont and 50th Avenue, is 60,000 kva.; for San Francisco, at Martin substation and at Marin substation on the north

shore, 90,000 kva.; at Cordelia 36,000 kva.; at Newark substation 72,000 kva.; and at the Vaca-Dixon and Contra Costa substations, 180,000 kva. This amounts to a grand total of 38,000 kva. These capacities will be increased proportionately as the Pit River power sources are completely developed.

The transformer installation for the Pit River plants at that time will be of 450,000 to 500,000 kva. capacity, with a generating capacity of approximately the same. With increased delivery of power, as further developments on the Pit are completed, appropriate additions will be made in the synchronous condenser capacity at various points along the line.

Transmission voltage at the generating end is 220 kv. and at the receiving end, Vaca-Dixon substation, 200 kv. Synchronous condenser capacity at the receiving end in the amount of 40,000 kva. per circuit holds the terminal voltage fairly constant. The line capacity under this condition, with 500,000-circ.-mil copper conductors, is approximately 250,000 kw. for the two circuits now in place over the 200 miles between the Pit River No. 1 plant and the Vaca-Dixon substation. Conductors on the present single circuit from Vaca-Dixon to Contra Costa substation also are 500,000-circ.-mil copper, in line with the comprehensive plan. Present condenser capacity at Contra Costa substation is 15,000 kva. which accomplishes the necessary power-factor correction for the industrial load in that vicinity.

The Vaca-Dixon-Newark 220-kv. line upon completion will be in effect an interconnection of large capacity between the northern and southern portions of the power system of the Pacific Gas and Electric Company, taking into account both owned and purchased power supplies. In other words this is just another step in the evolution of interconnection which has been observed in the building up of the so-called superpower system. This interconnection of parts of an existing system has come, as it has in the past, in other cases, when there was economic necessity for such a step.

## Electrical and Mechanical Design Features of High River-Crossing Spans

By L. J. Corbett

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THE cable selected for the river crossings encountered on the Vaca-Dixon-Contra Costa 220-kv. lines was chosen after considerable study. If 500,000-circ.-mil copper were adopted as for the remainder of the line the working strength permissible under company practice would have been 8,630 lb., and the sag for the longest span would have been of the order of 365 ft. This with the channel clearance required would have called for towers about 650 ft. in height, or 100 ft. higher than the Washington Monument.

It was believed that the conductor used at the

crossing should have conductivity of such a value that the current-carrying capacity of the line as a whole would not be reduced. For this reason the limitation of a 400,000-circ.-mil copper equivalent was set to guide the investigation.

A study then was made of hypothetical conductors. Their characteristics were tabulated. The table covered such items as diameter, ultimate strength, weight per foot, copper equivalent, sag for certain selected spans, and a relative factor—the ratio of strength to weight. Various combinations were tried, from all-steel, all-copper, all-bronze, or



all-Copperweld to different combinations or bronze and copper and of Copperweld and copper. Comparative tower-cost estimates made by the civil engineering division indicated that a material saving could be effected by using one of the combination conductors rather than pure copper. Accordingly a tentative combination was selected and formed the basis of negotiations with cable manufacturers.

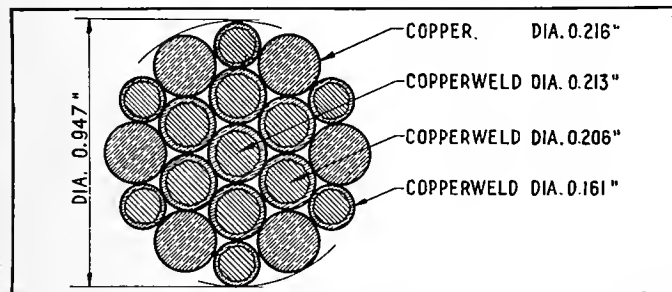


Fig. 1. Section of cable used for crossing spans showing arrangement of copper and Copperweld strands.

Incorporating certain suggestions of the Copperweld Steel Company and the John A. Roebling's Sons Company, the final cable selected was the mixed strand shown in Fig. 1. The Copperweld wires were of the "Xtra-Hi-Tensile" quality with conductivity 30 per cent of that of pure copper. Four sizes of wire were employed. The center wire is 0.213-in. Copper weld; the intermediate layer consists of 6 Copperweld wires 0.206 in. in diameter; the outer layer consists of 6 hard-drawn copper wires 0.216 in. in diameter alternated with 6 Copperweld wires 0.161 in. in diameter. The cable is concentric lay with both layers in the same direction to make a very compact strand. Overall diameter of this cable is 0.947 in.; its weight 2.16 lb. per ft. and its conductivity equivalent to 416,600-circ-mil copper. The working load of about 20,500 lb. maximum allows a factor of safety of 2.5 over the ultimate strength estimated by the manufacturer and a safety factor of 3 over the ultimate strength of 63,950 lb. found by test of a short piece of the finished cable.

### Insulator System

In recent years suspension type insulators have been developed to a stage meriting considerable confidence, and multiple strings have been used on important spans successfully. For a long time the Pacific Gas and Electric Company adhered to the conservative policy of using insulators only in compression on spans of especial importance. This policy was followed in the reinsulation of the Carquinez span in 1922 when the voltage was changed from 60 kv. to 110 kv.

In the present crossing, however, dependence has been placed upon suspension type insulators in multiple strings. A factor of safety of approximately 4 is provided which is reduced to 2 in case of mechanical failure of any insulator unit, when the load is taken up by the other parallel string or strings.

The general scheme of the crossings is shown in the profiles in Fig. 3. The tension in the conductors is held by low, but strong, anchor towers situated well back from the river banks. Only the weight and any pressure due to wind is carried on the high

towers at the long spans. The tension in each cable at the anchor towers is held by a special quadruple dead-end string, and the weight at the span towers is held by a double suspension string. "Extra strong" suspension insulator units are used in both assemblies.

The double string used at the span towers shown in Fig. 2 presents no unusual features. A plate-steel link and yoke support the two insulator strings from the tower and the cable rests in a groove on a long thin cast steel saddle. The strings are mounted in the plane of the line. A shackle above and bolt holes in the center line of the saddle provide attachment for take-up equipment when insulators are to be changed. The separate strings are similar to those used by the company on its other 220-kv. lines except that they are longer by four units. The same type of corona shield is used next the conductor as is used on the line suspension strings.

Limitations are set in the yoke so that in case of a broken insulator in one string the permanent parts will not be damaged. The long elastic cable, it is believed, will take up adequately the shock which

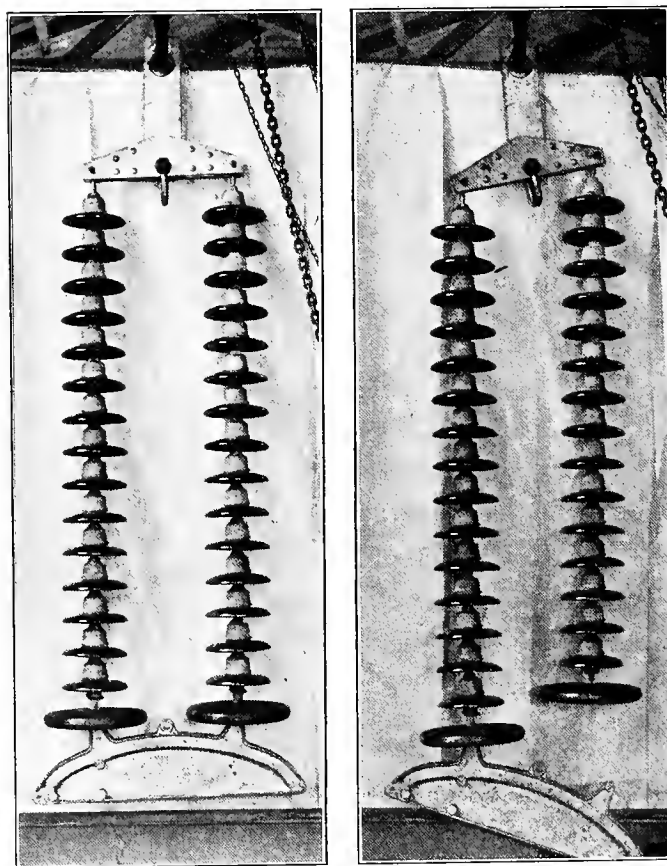


Fig. 2. Arrangement of suspension strings. The effect of one broken string is shown at the right. The cable support is so designed that the distance from upper support to cable is varied slightly by failure of one string.

ordinarily might be expected upon a sudden shift of load to the remaining string or strings. The position the string will assume in case of a broken string also is shown in Fig. 2.

The quadruple string is of unique construction in that the four strings are not in the same plane, but are set at the four corners of a square section

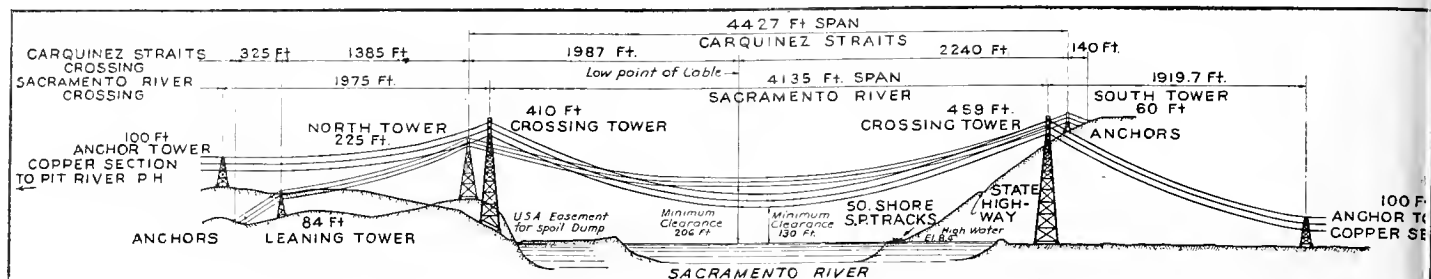


Fig. 3. Side elevation of Sacramento River crossing with elevation of old Carquinez crossing superimposed for comparison (left

and equalized in pairs across the diagonals of the square. The way this is accomplished may be understood from Fig. 4. Only four insulators were used in each string for the photograph assembly for convenience and to permit the closer view.

The lower frame holding the sheave to which the line conductor is attached is rigid, the equalization being accomplished by means of the yoke system on the tower end. The main yoke next to the tower is solid. One of the cross yokes holding two insulator strings is in two parts, pivoted in the center; the other is solid. The latter two yokes are at right angles to each other and are held in this relation by bolts through a forged steel link. The two half-yokes are suspended to the upper yoke midway between the center pivot and the points of attachment

of the insulator strings. The upper set of holes in the forged link are slotted while the bolt which goes through the holes is fixed in the main yoke.

When the tension in the separate strings is uniform, a condition which can be attained by adjustment of jack screw stems and nuts on each string, the bolt in the main yoke is at the center of the slotted hole as shown in Fig. 4 (left) and carries no load. If one of the strings on the divided yoke is broken the tension on the opposite string also is relieved; the strings on the solid yoke take the load and transmit it through the forged link to the center of the main yoke, the upper surface of the slotted hole now bearing on the pin. This is shown in Fig. 4 (center).

If one of the strings on the solid yoke is broken,

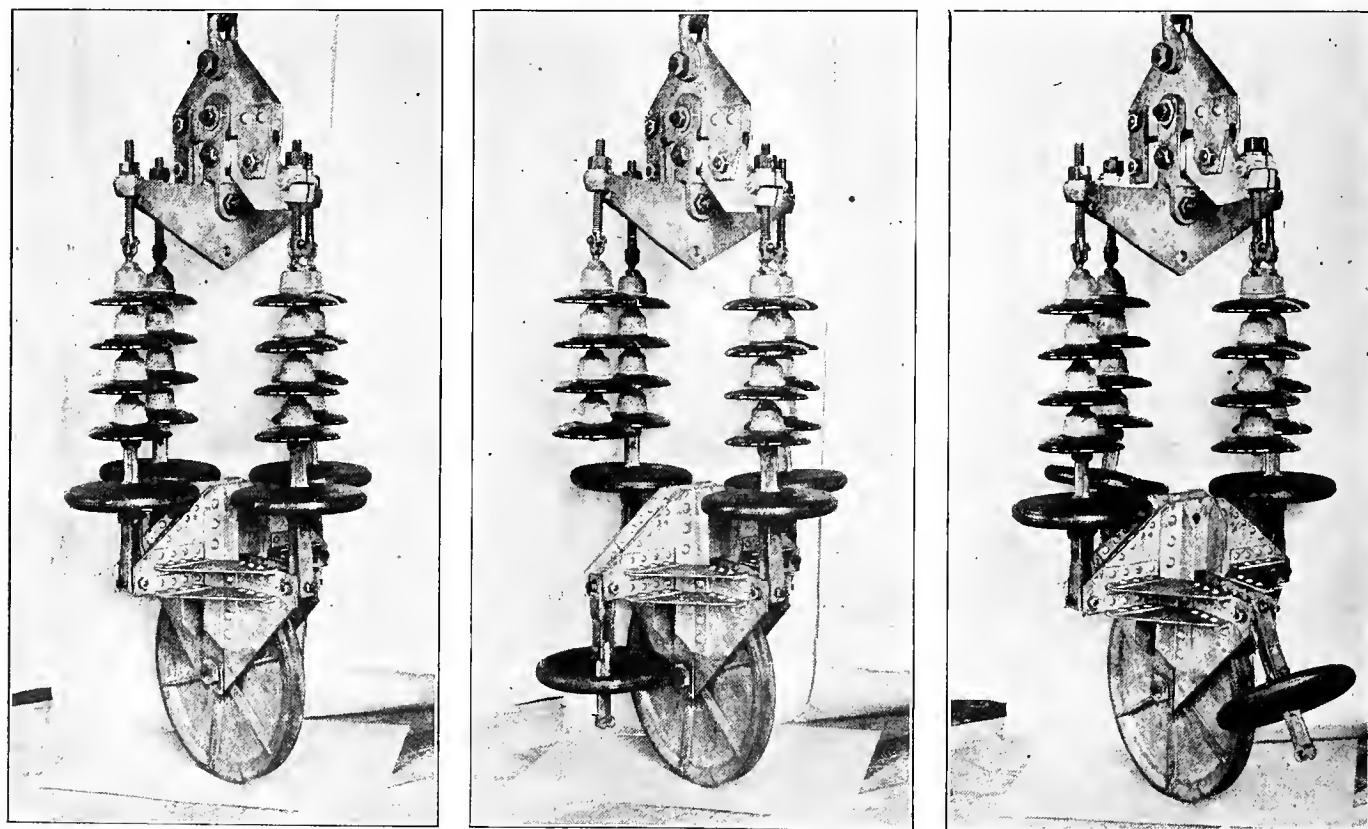


Fig. 4. Quadruple strain strings, shown in fore-shortened assembly for photographic facility. Intact assembly at left; one string on divided yoke broken, center; and one string on solid yoke broken, right. In the event of failure of any string the tension also is relieved from the opposite string through the yoke action.

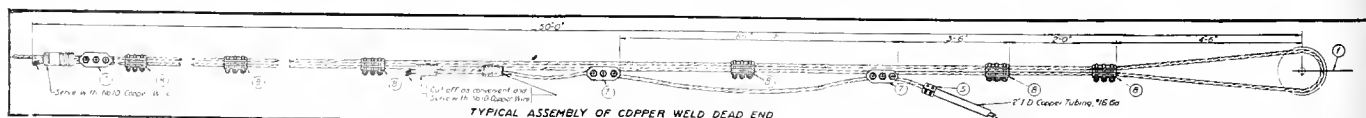
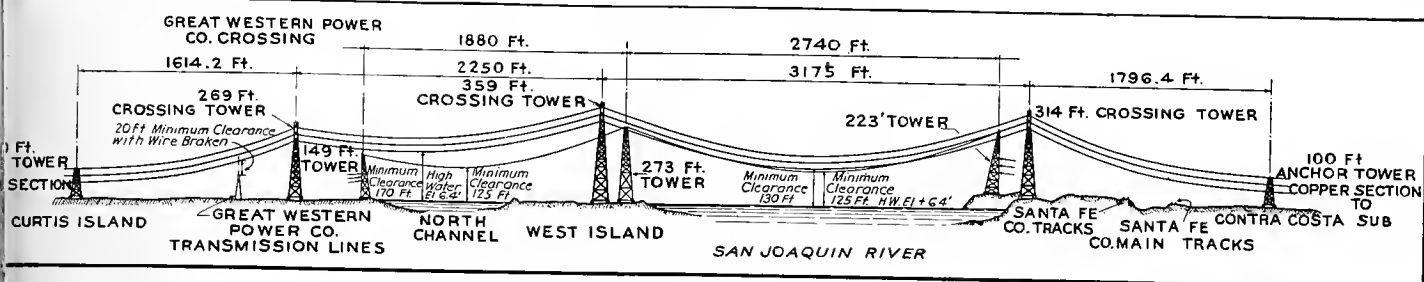


Fig. 5. Typical assembly of Copperweld dead-end showing method of serving and attaching copper cable thereto.



ation of San Joaquin crossing with adjacent crossing of Great Western Power Company 66-kv. line superimposed (right).

the tension on the opposite string is relieved; the strings on the divided yoke take the load and transmit it through the attaching links at the half-way points to the ends of the main yoke, the lower surface of the slotted hole in this case bearing on the center pin. This is shown in Fig. 4 (right). For this contingency it was necessary to provide swivels for the insulator supports on the divided yoke.

The amount of "drop" or "give" in the assembly when an insulator breaks can be planned as small as desired by properly dimensioning the slotted hole in the forged link. The present assembly permits  $\frac{5}{8}$  in. in either direction.

As in the double string, holes are provided on the sheave frame and on the lower yoke for the attachment of any supplementary equipment desired

U-bolts each, as shown in Fig. 5. The 500,000-circ.-mil copper cable of the standard section of the line is carried through the standard strain clamp on its side of the tower and is used as a loop. The first attachment of the loop to the Copperweld cable is beyond the second clamp holding the main cable and free end after its turn about the sheave. The loop is connected to the short end of the Copperweld cable by parallel-groove bronze clamps and serving.

The 50 ft. of Copper weld cable turned back from the sheave serves a two-fold purpose. First it allows ample length for the adaptation of any attachments in case removal or readjustment of a cable may become necessary. Second with the further addition of the end of the loop, it serves the immediate and continuing purpose of cushioning out vibrations in the cable, thus obviating crystallization at the support.

#### Conductor Loops on Anchor Towers

Excessive spread on the anchor towers between the conductor ends on each side made the loop problem particularly important. The anchor towers are battered directly toward and away from the crossing, but not at all at right angles to the line. For structural reasons cable attachments are made at the legs and thus, in each circuit, in the same vertical plane on the side toward the crossing. On two of the towers appreciable angles exist between the line of the crossing and the adjacent portion of standard line. In the maximum case the angle is about 22.5 deg. On all four anchor towers wide, flat crossarms extend out on each side to support the connecting loops between Copperweld and copper conductors by means of two, or on the lower arm, three strings of insulators each.

Tests on an experimental set-up, with the distances laid out, confirmed the conclusion that the 500,000-circ.-mil copper cable alone would not be safe for use in swinging loops. Rather than attach small truss members to the cable the stiffening is obtained by threading the cable through copper tubing. The horizontal sections are bent at the ends to approximately correct alignment, but simple ball-and-socket joints serve to connect this portion to those covering the inclined portions of the loop. The tubing is carried from the standard clamp on the copper cable to the point of attachment of the loop on the Copperweld cable. The ends of the tubing are held to the cable of the loop by a simple centering clamp which prevents displacement of the tubing along the cable. The appearance of the loops and dead end strings may be noted in the view from between the circuits shown in Fig. 6.

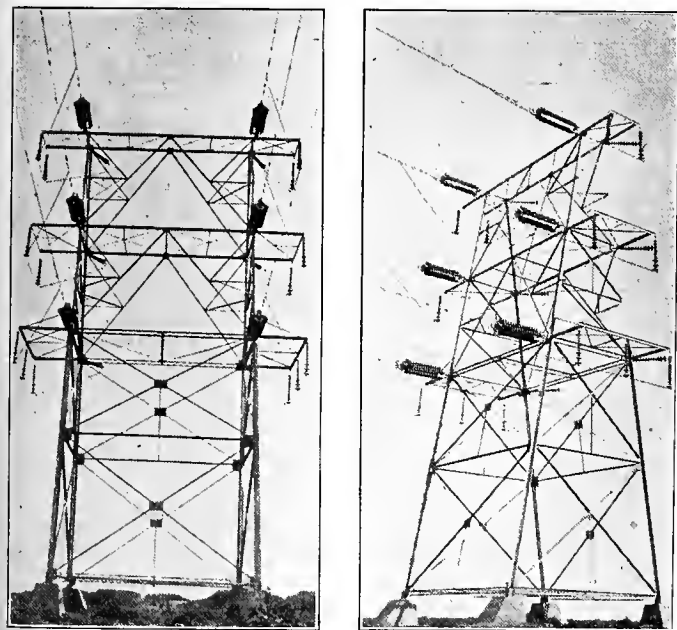


Fig. 6. Completed anchor tower showing appearance of dead-end assemblies, etc. Note rigid copper tubing carried past tower on three insulator strings. Flexible copper cable is strung through this tubing for rigidity.

for erection purposes or for major changes of insulators. Occasional changes of individual insulator units can be handled by relieving one set of strings at a time by means of the jacks provided at the tower ends of the strings, the other pair taking the entire load.

#### Attachment of Cables to Anchor Strings

The Copperweld cable is turned back over the sheave on the quadruple dead-end string, is carried back 50 ft. and attached to the strain cable by six clamps of special design which are held by three

# Structural Features of a 459-ft., 220-kv. Double-Circuit Transmission Tower

By Walter Dreyer

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**P**RELIMINARY studies resulted in fixing the type of cable and in establishing the general configuration to be used for the two principal river crossings on the Vaca-Dixon-Contra Costa 220-kv. transmission line. With the type of cable and its elastic and thermal properties determined, the next step was the calculation of the proper sags

and corresponding stresses in the cable. A maximum stress of 21,800 lb. was permitted in the conductor under the very remote conditions of a temperature of 25 deg. F. and a wind pressure of 14 lb. per sq.ft. of projected area of cable. With this stress existing under extreme weather conditions it was necessary also to calculate the sag which would

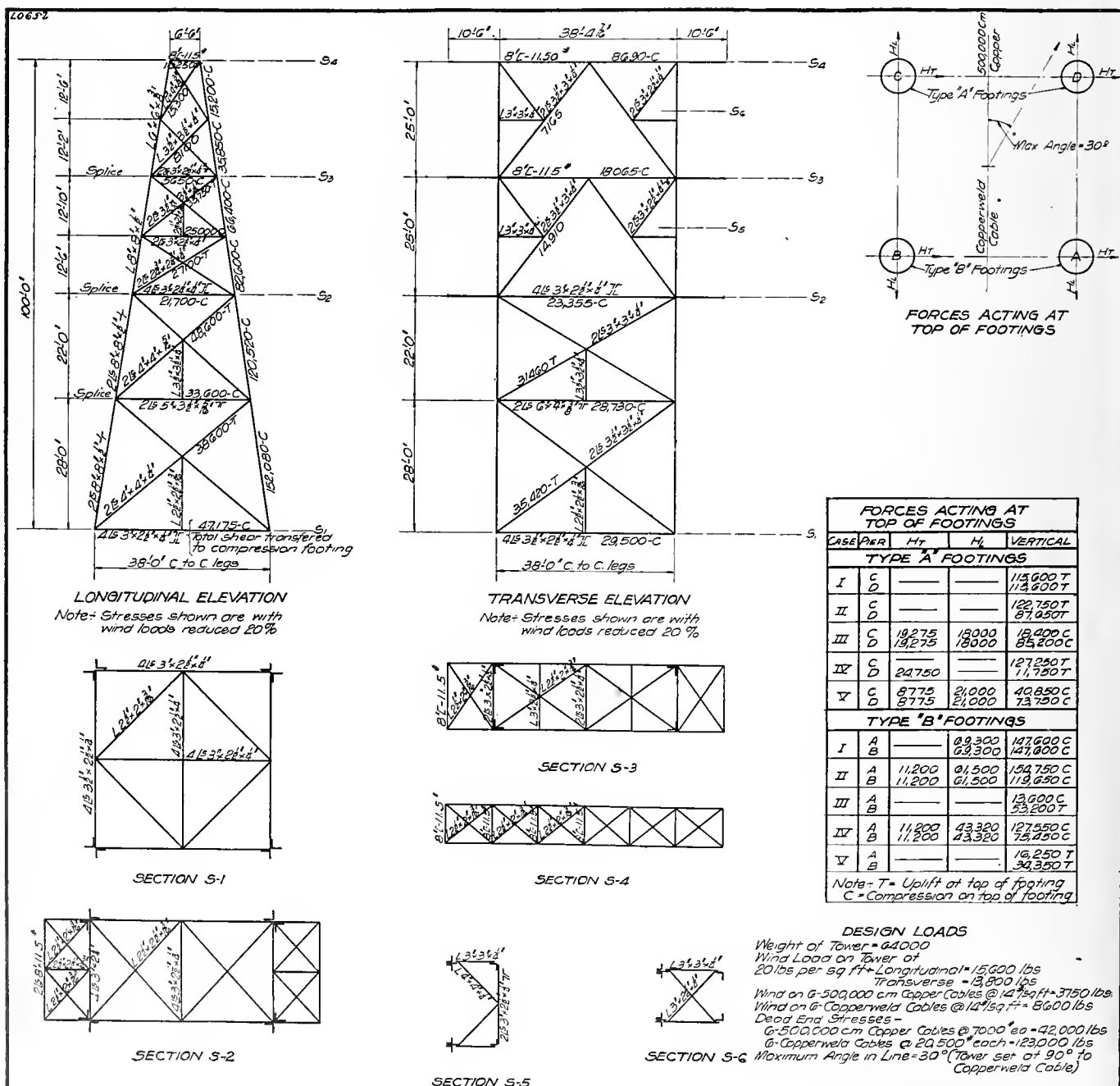


Fig. 1. Stresses resulting in anchor tower from assumed loads given in adjacent text.



occur on a quiet summer day with no wind blowing and a temperature of 130 deg. F. in the cable. This latter condition results in the greatest sag and determines the height of towers required to maintain the specified clearance over the river channels. The result of this study early determined that the structures required at the Sacramento River probably would be the highest towers ever used for transmission purposes. The three towers at the San Joaquin River are of lesser height, but with the exception of the base details are of the same design as the upper portion of the higher Sacramento River towers.

### Loads for Design

The low anchor towers are designed to withstand safely the following loads:

Weight of 6 cables plus insulators.....	23,000 lb.
Weight of tower.....	64,000 lb.
Transverse wind on 6 cables and insulators at 14 lb. per sq.ft.....	12,400 lb.
Wind load on tower at 20 lb. per sq.ft.....	15,600 lb.
Tension from 6 cables at 20,500 lb.....	123,000 lb.

The high crossing towers are designed to withstand safely the loads shown below. It may be noted that provision is included for dead-ending any one wire on the cage of the tower. Allowance also is made for the slightly unbalanced loads that may accrue due to temperature changes in the catenary which will deflect the insulators in a longitudinal direction.

Weight of 6 cables plus insulators.....	69,000 lb.
Weight of towers.....	405,000 lb.
Transverse wind on cables taken at 45 deg. to line .....	14,400 lb.
Wind load on tower, taken at 20 lb. per sq.ft. (for the 459-ft. tower).....	108,000 lb.
Unbalanced load due to any one cable at 20,500 lb. plus 5 remaining at 1,000 lb. each.....	20,500 lb.

Stresses in the structure resulting from these loads and the sizes of members required are shown in Fig. 1 for the anchor tower and in Fig. 2 for the highest crossing tower.

### Allowable Stresses in Members of Towers

Allowable stresses adopted for designing the structure are the values recently recommended by the American Institute of Steel Construction. For convenience in applying these formulae the wind load of 2 lb. per sq.ft. of projected area of tower and 14 lb. per sq.ft. of projected area of cable have been reduced 20 per cent. This was done instead of the usual method of permitting combined dead, live and wind load to exceed by  $33\frac{1}{3}$  per cent the stresses given by formula. In view of the fact that wind stresses are relatively larger in towers than in buildings, only 20 per cent reduction instead of the  $33\frac{1}{3}$  per cent customary in building and bridge practice was permitted.

### Design Features of Towers

It was decided early that the towers would be of conventional double-circuit construction owing to the economy inherent with that type of structure. Configuration of the cage therefore was determined by the length of insulator strings, the lateral de-

flection of insulators and cable under wind load, and the specified clearance of 7 ft. between the cable and any part of the tower. These factors resulted in adopting a vertical separation of 25 ft. and a horizontal separation of 37 ft. as compared with 15 ft. and 24 ft. respectively on the standard construction. The middle arm is extended 6 in. beyond the lower and the upper arm is extended 6 in. beyond the middle arm in order to permit the lowering of any cable at a future date without the cables rubbing on each other as they are moved. The base width of the towers was determined by trial, choosing the dimension which gave the least tower and foundation cost.

In addition to making the tower adequate for strength, it was necessary to provide certain conveniences for making the tower accessible and for permitting men to work on the crossarms, over 400 ft. above the ground. The first was accomplished through the medium of a stairway instead of the customary ladder, and the second by making of each crossarm a platform with solid floor and railing. In addition to the three crossarm platforms a fourth was added below the lower arm so that insulators and hardware could be detached and lowered a short distance to men in close contact with those on the crossarm above.

Anchor towers are constructed entirely of angle sections, some members being tied together by lacing. The entire structure is galvanized and all field connections are bolted. The crossing towers are galvanized and have bolted joints in the upper portion, which extend 49 ft. below the cage. In that section the tower members are quite generally angles. The lower part of the towers is composed of built-up members, usually laced channels for compression members and angles tied with batten plates for the tension members. This part is, of necessity, shop riveted and therefore painting rather than galvanizing is relied upon for preservation of the steel.

### Tower Foundations

Soil conditions at the tower foundations are of three general classes. The two towers north of the Sacramento River are located on clay or hardpan strata. The two towers south of the San Joaquin River are founded on sand or sandy loam. Foundations for these four structures therefore are of simple design. Each pier is designed with sufficient weight to resist the maximum uplift with a safety factor of  $1\frac{1}{2}$ .

Between the Sacramento and San Joaquin Rivers, however, the foundation material is not so satisfactory. The delta land is made up of very fine silt together with decayed vegetable matter or peat which has gradually consolidated until it is capable of supporting light loads. This formation varies in depth across the delta and timber piles varying from 30 to 80 ft. in length were required to support the towers. The anchor towers as located must resist in addition to the vertical loads a horizontal pull exceeding 60 tons due to the dead-end tension of the cables. Bases of these towers therefore were designed to transmit all of this shear to the compression footings, and the piling was inclined so

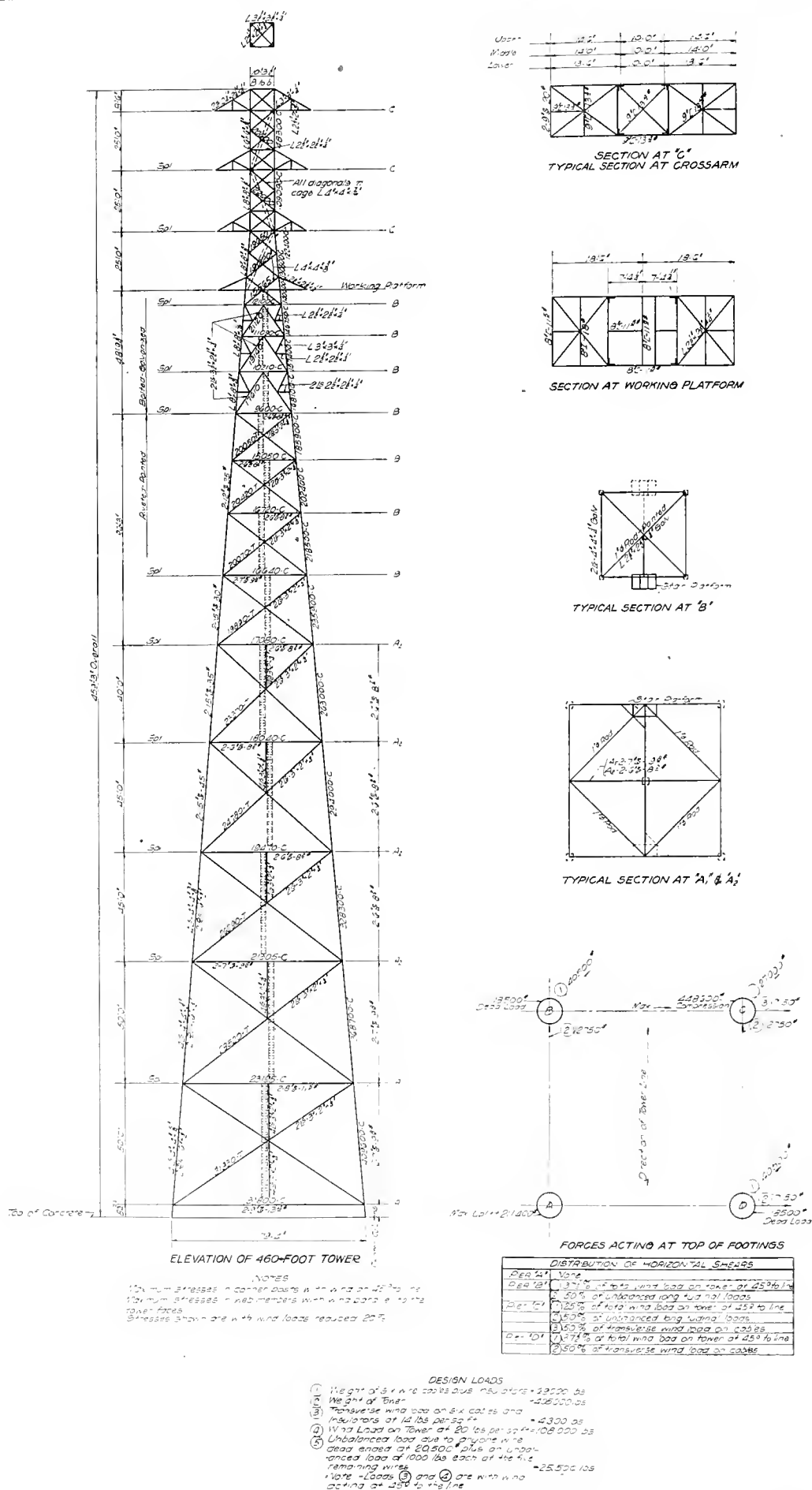


Fig. 2. Stresses in highest (459-ft.) crossing tower resulting from loads given in adjacent text.

that it lay in the direction of the resultant of the vertical and horizontal loading. The inclined piling was put down to the same depth as the vertical piling, driven to the penetration required by the Engineering-News formula, since it was felt that no reliance could be placed upon a formula for inclined driving.

#### Physical Data on Towers

Weights, concrete quantities, and number and length of wood piles required to construct the towers at the two main river crossings are shown in Table I, following.

TABLE 1—Data on special towers for Sacramento and San Joaquin River crossings of Vaca-Dixon-Contra Costa 220-kv. transmission line.—Material quantities for one complete tower.

Type	Tower	Location	Weight Steel (Tons)	Concrete Foundations (Cu. Yds.)	Piles Length (Ft.)	Number
100 ft.	Anchor	North Bank-Sacramento	31	139	- None -	
100 ft.	Anchor	South Bank-Sacramento	31	139	66-78	16 Battered
						16 Vertical
100 ft.	Anchor	North Bank-San Joaquin	31	139	68-75	16 Battered
		North Channel				16 Vertical
100 ft.	Anchor	South Bank-San Joaquin	31	139	- None -	
459 ft.	Crossing	South Bank-Sacramento	202	270	56-67	75 Vertical
410 ft.	Crossing	North Bank-Sacramento	167	331	- None -	
				(Special deep footings)		
359 ft.	Crossing	North Bank-San Joaquin	154	251	29-37	59 Vertical
314 ft.	Crossing	South Bank-San Joaquin	133	231	- None -	
269 ft.	Crossing	North Bank-San Joaquin	113	250	44-51	55 Vertical
		North Channel				

## Construction Features Involved in 220-kv. Crossing Over Navigable Streams

By E. H. Steele

Engineer of Line Construction, Pacific Gas and Electric Company, San Francisco

**A**FTER the design of any undertaking has been completed by the engineers the construction man's troubles begin. It is with a view toward pointing out a few unique features involved in erecting towers and stringing cables on towers up to 459 ft. in height that this article is written.

Foundations and steel erection did not involve any special problems and therefore will not be dwelt upon except to state that, because of the great height of the towers, equipment had to be used in proportion to the weight of members involved in the erection of this steel. So far as the procedure was concerned, however, the general practice followed in the erection of ordinary steel towers was employed. In the stringing of the cables on these towers, however, several special problems arose which had to be worked out. The features of these will be dealt with more specifically.

It should be appreciated that from anchorage to anchorage the distance is approximately  $1\frac{3}{4}$  miles; that each cable was in one continuous piece; that the actual weight of each length of cable was approximately 10 tons; that the supports for the cable on the high towers were working in tension rather than compression, and that several natural as well as artificial obstructions were in existence within the spans involved. All of these had to be given careful consideration before the work could be organized and a start made.

#### Procedure of Stringing

From the profile shown in Fig. 3 on page 370 it may be noted that a narrow strip of land, known as West Island, divides the San Joaquin River into two channels. This is a natural obstruction to an easy procedure with the stringing of the cables since it was desirable to anchor the working barge with its reel of cable at one of the river banks in order to carry the first end to the nearest anchor tower by means of running lines. With the cable anchored at that point it would have been ideal to proceed across the strip of water with the barge, paying the cable out into the stream and after landing at the farther shore, there to remove the unused portion of cable from the reel, laying it out in the form of a figure 8, either on the working barge or at a convenient point near the shore and thus permit the second end of the cable to be fastened to the second anchor.

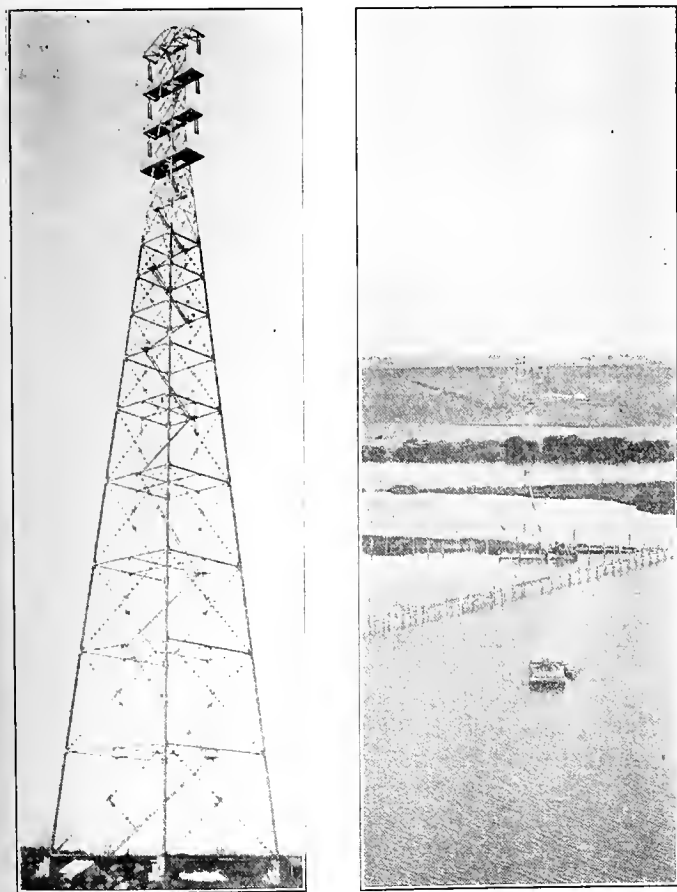


Fig. 1. Completed high tower (left). Note comparative size of construction camp at base of tower. Looking north across the Sacramento from the high tower (right). Note obstructions that had to be crossed in stringing cables.

As the working barge could not be passed around West Island it was anchored on the south bank of the island in the San Joaquin River proper. The storage barge, which was a derrick barge used for loading and unloading as well as for the storage of copper, was located on the south bank of Curtis Island in the north channel. Working lines then were carried between the working and storage barges and between the storage barge and the anchor tower on Curtis Island. With the working lines in place the main cable was unreeled across West Island, North Channel and Curtis Island to the anchor tower. After the main cable had been made fast at that point sufficient slack was pulled into the main cable to allow for lifting it to its final position on the towers adjacent to the North Channel.

The working barge then was towed across the main San Joaquin River, laying the cable in the stream in the manner employed with a submarine cable. After landing at the opposite side of the stream the balance of the cable was paid off the reel and carried to a convenient sand bank at the shore line. There it was placed in the form of a figure 8 to gain access to the end at the center of the reel. After the end was reached the main cable was carried ahead toward the second anchor tower, leaving sufficient slack to permit raising the cable to its proper position on the supporting tower at the south bank of the San Joaquin River. The cable then was fastened at Anchor Tower No. 1, still resting on the channel bottom between these towers.

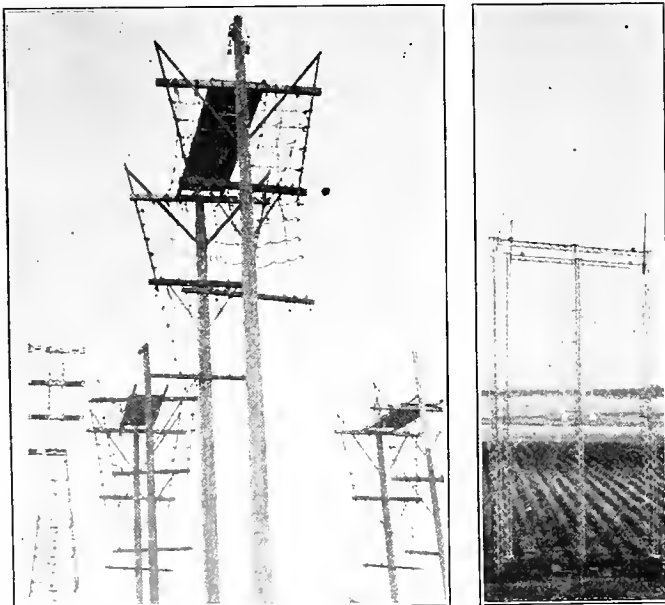


Fig. 2. Protective "baskets" over low-voltage lines (left) and over high-voltage lines (right) to prevent cables falling into live lines.

With the main cable in that position the cable did not reach within 1,800 ft. of the second anchor tower.

A 3-drum hoist of sufficient capacity was stationed back of the second anchor tower and to this hoist the main pulling lines were attached. These were led out over the anchor tower to the end of the main cable and the cable was pulled through its

various snatch blocks out of the river bed and clear of shipping. It was necessary to carry on this work without obstructing traffic on the river. The hoist, on a direct pull such as this, was able to bring the cable to a tension between 8,000 and 9,000 lb. Tension on the main cable then was transferred to triple-sheave blocks. The line passing through



Fig. 3. Three-drum steam hoist used in pulling cables into place.

these blocks was fastened to a second drum of the pulling hoist and the main line again pulled until it was brought to final tension and subsequently fast at the second anchorage, just in front of the pulling hoist.

In addition to the natural obstructions in this crossing there were two circuits of the Great Western Power Company's 110-kv. transmission line to be crossed on Curtis Island, as well as 4-kv. and 11-kv. lines of the Pacific Gas and Electric Company, the Great Western's 22-kv. line, telephone and telegraph lines and the Santa Fe railroad track between the high supporting tower on the south bank of the San Joaquin River and the second anchor tower on the main line. Work had to be carried out without interfering with the service in any of the power circuits, communication circuits or the railroad.

#### Details of Methods

Fig. 2. shows some of the characteristic protective bridges, or baskets as commonly called, designed to protect the lower voltage power circuits and communication circuits. The lattice steel-pole structure shown is protecting the two 110-kv. Great Western circuits previously mentioned. Although it cannot be seen in the photograph there is a network of flexible cables running both parallel and at 90 deg. to the main cables being strung. This made it impossible for a cable, if broken, to fall onto the live circuits.

Fig. 1 is given an aeroplane-like view taken from the tower on the south bank of the Sacramento River. This shows the working barge being towed to the south bank with a reel of cable after the end of that cable had been made fast to the anchor tower on the mainland some 1,900 ft. back of the high tower which may be seen in the background. The working position of the anchor barge also may be noted as well as the natural obstructions in the river channel, all of which had to be crossed. These obstructions included a dredge pipe-line, a small island and a dyke. The distance from the tower on which this picture was taken to that in the background was 4,135 ft.



Sheaves and bridle used in carrying the cable from the ground to the supporting position on the high towers is shown in Fig. 5. The sheaves in this rig were more than 2 ft. in diameter and their distance apart was so determined as to provide sufficient

the insulators in position but after the cable had been pulled to tension appears in Fig. 4. The turnbuckle, it may be noted, was inserted in order to complete the assembly; to maintain the proper dis-

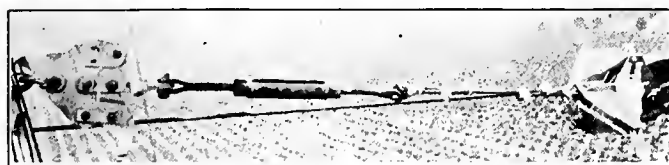
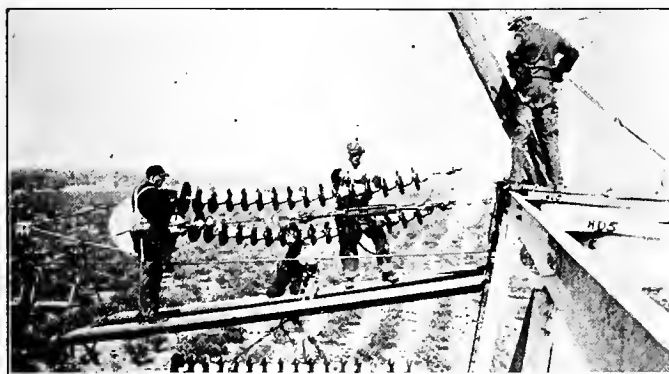


Fig. 4. (Lower) working chair used for linemen in handling suspension strings. (Center) dead-end hardware partially assembled. (Top) dead-end assembly partially completed; note that the insulator strings are raised into position on a special cradle so that all the line crew has to do is attach the links at each end of the string. A string is shown just being raised into position.

working room to insert the permanent saddle supporting the cable. Arrangements also provided for local adjustment of the bridle to facilitate the work of the linemen in attaching the insulators.

Fig. 4 shows the working chair used to lift linemen to the proper position to make fast the temporary supports and also to transfer the cable from its temporary to its permanent position. This ring was very carefully designed not only for lightness but for strength and security, bearing in mind that the men had to work in these chairs at a height of more than 400 ft. from the ground.

A suspension string of insulators in position on one of the high towers is shown in Fig. 5. The cable had just been placed in its permanent saddle at the lower end of the strings, and the men were in the act of releasing the turnbuckle to transfer the cable weight from the temporary supporting sheaves.

Hardware assembly at a dead end before placing

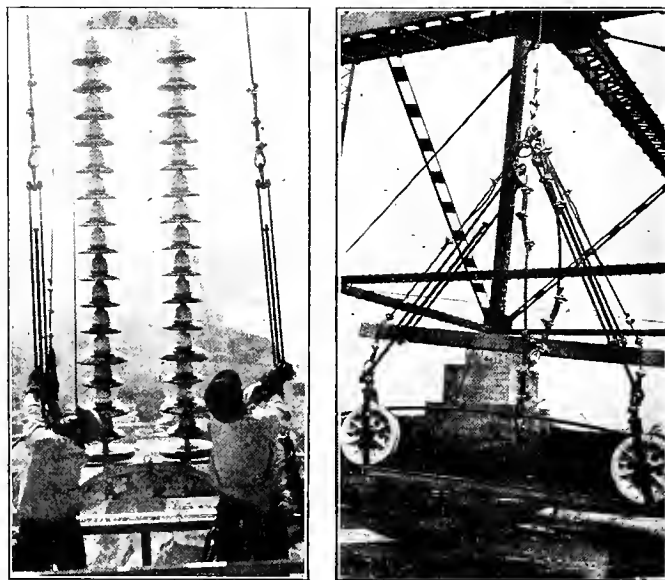


Fig. 5. Sheaves and bridle with cable in place ready to be raised to the top of a tower for attachment to the insulator assembly (right). Cable in position (left) and linemen easing away on bridle to transfer strain to cable support on insulator strings.

tance between the upper and lower ends of the assembly; and to make such adjustments as were necessary to permit inserting the insulator strings.

A portion of the derrick placed on top of one of the dead-end towers is shown in Fig. 4 (upper). This was used in lifting the hardware assembly into position, a single assembly weighing more than 1,500 lb. This illustration also indicates very much in detail the working platform which was designed to support the workmen during the time they were inserting the insulator strings in the dead-end assemblies. This working platform was supported on the anchor tower on one end and on the main cable at the other. At the extreme left of the picture may be seen the trolley chairs which were used by the workmen in going out on the cable to make up the dead-end clamps. Also, just under the working platform, is shown a string of insulators being raised to position on a special frame designed for that purpose so that they could be lifted in a horizontal position. The strings were too long and too heavy to be otherwise handled by the workmen, but could be inserted readily in place with little difficulty by this means.

It is noteworthy to state that this work was accomplished without a single serious accident. The stringing of the cables including time occupied in getting the equipment together consumed a period of six weeks, the schedule which was allotted to the job before it was commenced. The line was placed in service on Friday, Sept. 17, and now is regularly carrying power between the Vaca-Dixon substation and the Contra Costa substation as a major part of the network of transmission lines of the Pacific Gas and Electric Company.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## New Features Applied to Large Wilson Transformers

Of particular interest at the new Wilson substation, the transmission tie-in point between the systems of the San Joaquin Light & Power Corporation and the Great Western Power Company, is the bank of 30,000-kva. transformers. This bank is composed of four 30,000-kva. G.E. units operating at 60 cycles, is Y-connected on both sides, and rated 220/125 kv. Also there is provided delta tertiary winding of sufficient capacity to supply the 25,000-kva. synchronous condenser.

Natural cooling is sufficient to take care of capacities up to 57 per cent of the rated capacity of the bank. For greater loads additional cooling is provided by air jets from a system of piping so arranged that the air in immediate proximity to the cooling vanes is kept in positive motion as long as the air system is in operation. These particular pipes may be discerned in Fig. 1 which is a reproduction of a snapshot of this bank. From this illustration it may be noted that there is a main air header completely encircling the base of the transformer. From this header there is a branch supply pipe each side of each cooling wing supplying air to lateral pipes. These lateral pipes are pierced with two series of holes so that a jet is blown upward and downward from each pipe impinging upon the vanes at a flat angle.

This air circulation system is based upon a low pressure rather than a high pressure. Experiments proved that a gentle draft of air from these spray pipes was sufficient to keep in motion the air adjacent to the vanes. A high-pressure system involved a greater expenditure of energy in air supply and accomplished practically no better results. Air for the bank is supplied by a blower located a few feet from the transformer bank and connected to each transformer header through an underground duct. A 35-hp. blower does the trick.

Height from ground to the top of the transformer is in excess of 28 ft. The weight of each unit is 130 tons.

A range of taps in the common high-tension winding provides for a voltage delivery of from 105 to 125 kv. on

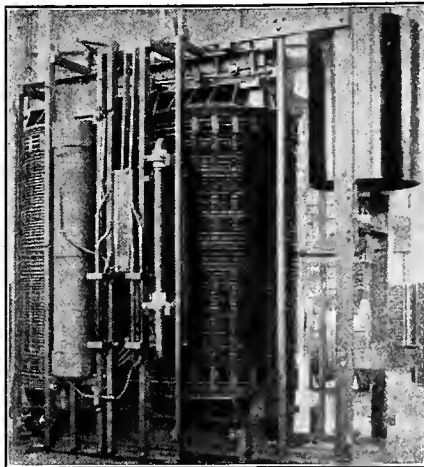


Fig. 2. Interior of one of the 30,000-kva. Wilson transformers showing the installation of condenser.

the low-tension side. A buffer winding is placed between the 125-kv. sections, and the whole tap section is protected at each end by electrostatic shields. However, an analysis of the design showed that the capacitance of these electrostatic shields would not be sufficient to relieve the ratio adjuster of potentials that might be difficult for it to withstand. Therefore it was necessary to increase the capacitance between the tap terminals and across the ratio adjuster in order to decrease the transient voltage incident to tap changes. This was accomplished by the installation of a 3-electrode condenser. The middle electrode of this condenser is connected to the common point of the ratio adjuster and the other two electrodes of the condenser are connected

respectively to the maximum and the minimum taps. Thus no matter in what position the ratio adjuster may be, there will be a capacitance connected across the tap portion of the winding involved; that is, a capacitance from the incoming line to the tap. By this expedient the tap portion of the winding is brought instantaneously to a potential approximately uniform regardless of the tap to which the ratio adjuster happens to be connected. This interior arrangement is shown in Fig. 2.

Another interesting feature of the Wilson installation is the 110-kv. type FHKO-39 high-speed oil circuit breakers. These breakers are operated by the new motor-driven centrifugal mechanism, the operating characteristics of which seem to be much more desirable than those of solenoids. The installation in this particular case makes practical the synchronizing of the two power systems through the high-tension circuit breakers.



Unrolling a reel of 400,000-circ.-mil, 11-kv., 3-phase cable upon the deck of a cable barge preparatory to laying it across the Willamette River from Columbia Street to East Clay Street, Portland, Ore. The cable belongs to the Portland Electric Power Company and the laying job was done by the Pacific Telephone & Telegraph Company. With one reel of the cable coiled in a figure 8 on the barge deck and the second reel mounted as shown, the 600-yd. laying job was done in a total elapsed time of seven minutes. The cable weighs 26 lb. per ft.

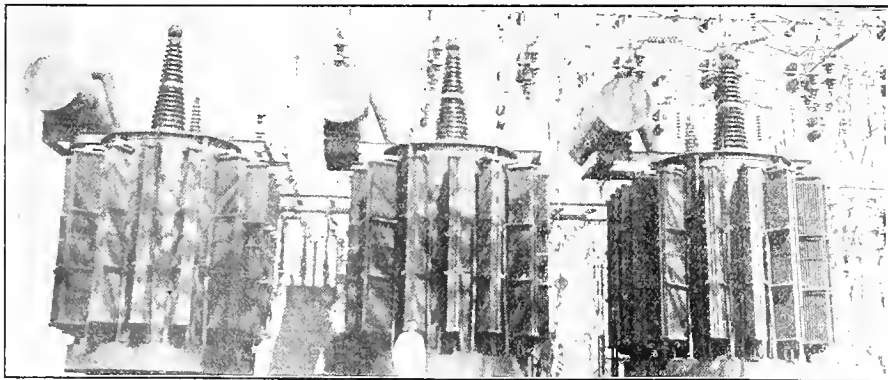


Fig. 1. Bank of 30,000-kva., 125/220-kv. transformers at Wilson substation of the great Western Power Company. Comparative size is well indicated by the presence of J. M. Renfrew of that company's electrical engineering department. Mr. Renfrew stands well over six feet.

**Power Factor Correction for Individual Motors.**—Further advance in the study of the causes and correction of poor power factor is evidenced in the announcement of the Westinghouse company that static condensers in sizes of from ½ to 5 kva. are now in production for that application.

# IDEAS FOR THE CONTRACTOR

## Sacramento Elks Lodge Equipment Well Planned

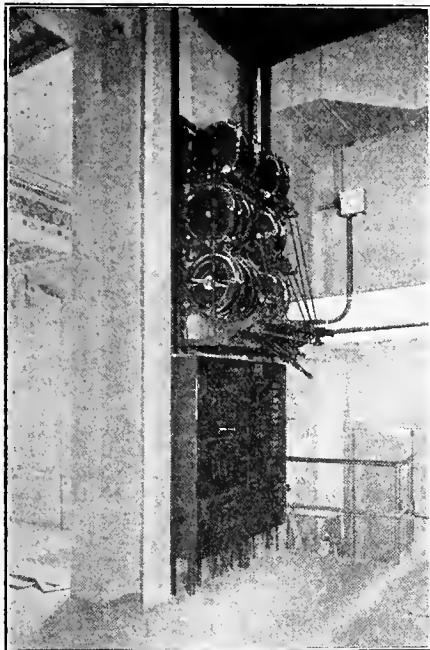
### Fixtures Especially Beautiful and Stage Lighting Control Possible by Means of Complete Dimming System

The new 14-story Elks building in Sacramento, Calif., finished not long ago, contains a number of electrical features to make it one of the most up-to-date buildings of its type in California.

The fixtures used for lighting throughout the building are unusually beautiful, having been designed especially for the building by Mr. Bernhardt. The fixtures were manufactured by the Boyd Lighting Fixture Company of San Francisco.

To control the lighting of the lodge room, Cutler-Hammer dimmers are installed; these control the lodge room fixtures and lighting over the tapestry panels. These tapestry panels are illuminated by means of troughs located at the top of each panel. A stereopticon lens in the ceiling space illuminates the clock located in the lodge room.

A Wurlitzer electric organ is installed in the lodge room. The keys of the organ operate relays which in turn operate the pipes of the organ.



Stage and auditorium lighting controlled by means of dimmer banks in the Sacramento Elks building.

In the ball room located on the second floor dimmers are installed on all of the ceilings, as well as for the foot border lights of the stage at one end of the hall. Master dimmers control the foots of red, white and blue as well as two borders of red, white and blue. Floor sockets (Major) are in-

stalled on the stage. A Major outlet is also installed on the balcony for the use of a moving-picture projector.

Outlets on the veranda of the building are wired with water-tight plugs to provide for lamps used during summer evenings.

#### Kitchen Equipment

The kitchen connected with the dining room is especially well equipped



Beautifully designed fixtures used in ballroom of Sacramento Elks building.

electrically. A Hobart food grinder and cutter is in use in the kitchen. This is a mechanically and electrically interlocked machine. The interlock on the food grinder consists of a tumbler switch interlocked with a mechanical lock. When the electric drive is on the mechanical cannot be operated. This prevents the knife housing from being raised. A Hobart mixer is also used. Vapor-proof fittings are installed in the range hood to provide electric lighting over the range. A Crescent electric dishwasher is in operation and electric waffle irons and toasters are used.

Elevator service is provided by two Spencer-Westinghouse passenger elevators; telephone service comes in through a PBX board. An electric clock system extends throughout the building, operated from a Standard Electric Time Company master clock.

#### Basement Equipment

The sub-basement under the building contains the circulation pumps and filters for the swimming tank, the condensation pump and also a sump pump. The main switchboard located there is split; one board being used for lighting only, which service is supplied by the Pacific Gas and Electric Company, and one for power only, supplied by the Great Western Power Company. The pumps for the house service connect to the city mains.

Three supply fans and one exhaust fan are used to ventilate the building. All of the air which is circulated throughout the building is washed and may also be heated. Fans in various parts of the building take care of local ventilation, in addition to the general ventilating system.

#### Exterior Lighting

Originally the finial on top of the building was designed for copper but was changed to glass in order to provide for illuminating effects. This finial is 6 ft. high and hexagonal in shape, 24 in. in diameter running up to a pyramid. It is wired with three circuits of red, white and blue, and so connected that any or all of them



Panel controls for building light and power, Sacramento Elks building.

may be used at one time. There are 120 50-watt lamps installed in this location.

The electrical installation was made by Latourette-Fical Company, Electricists of Sacramento. F. O. Hutton, Elks building engineer, designed the installation.

## Radio Installation Rules Issued in New Code Booklet

One of two handbooks of the Bureau of Standards, namely, No. 9, just off the press, sets forth safety rules governing radio installations. This booklet is a part of the latest revision of the National Electrical Safety Code, now being issued in separate parts and later to be printed in combined form. The official summary of the booklet is as follows:

Handbook No. 9 contains safety rules governing radio installations. It will be found of value to owner and operators of trans-

fastened in a workmanlike manner. The code also requires that the lead-in wire shall enter the building "through a rigid, non-combustible, nonabsorptive, insulating tube or bushing, or through a drilled window pane."

For receiving stations, grounds must not be made to gas pipes, but should be made to cold-water pipes, if these are connected to a street main. An outlet pipe from a water tank fed by a street main or a well may be used, provided such outlet pipe is adequately bonded to the inlet pipe connected to the street main or well. Where the wire is attached suitable clamps must be used, and the entire surface of the pipe covered by the clamp must be scraped clean.

Rules for the application of protective devices, such as lightning arresters, and antenna grounding switch are also given. Each lead-in conductor for a receiving station must be provided with a lightning arrester, whether or not an antenna grounding switch is used. The arrester may be either outside the building or inside, if away from the combustible materials.

If a receiving set is connected to a power supply line, the device used and methods of wiring must be in accordance with the rules covering permanent or portable fixtures, devices, and appliances as given in section 37 of the National Electrical Safety Code. The wiring of storage batteries must also conform to these rules, and such batteries must be placed where there is adequate ventilation.

## Medford All Electric Apartments Bring Advance Demand

Complete electrical equipment for the new Schuler apartments of Medford, Ore., recently completed, resulted in the fact that practically every apartment in the building was reserved before the building was completed.

The new structure represents an investment of nearly \$100,000 including building, grounds and equipment. It is situated at the corner of Sixth and Oakdale. The apartment building contains 25 apartments which are electrically equipped throughout. Some of



Wall type electric ranges make available more kitchen space.

mitting stations and to the general public, because it contains many valuable rules for the installation of receiving equipment. Among these may be mentioned the following:

Antenna supports must be sufficiently rigid and of such size as to withstand any load which may come on them. Attachment to chimneys should be avoided. Metal poles or masts extending more than 10 ft. above the supporting building must be permanently and effectively grounded.

Locations involving crossings over railroads, supply lines, etc., should be avoided, but where no other location is possible special rules are given for the installation.

In the case of receiving stations, lead-in conductors shall be not less than No. 14 not less than No. 17 A. W. G. (0.045 in.) if made of bronze or copper-covered steel. Clearances are given between lead-in wires and other conductors on the building and it is recommended that lead-in conductors be "securely



The recently built Schuler Apartments at Medford, Ore., completely equipped electrically.

the outstanding features include the individual electric ranges, electric refrigerators and radio receptacles with which every apartment is equipped.

The electric ranges are of the Standard built-in type, occupying very little space in the kitchen. A small Frigidaire electric refrigerator is also part of the regular equipment.

## Electric Laundry for Tenants

The individual radio connections are directly connected with a large central receiving set located in the basement and operated by the management. In the basement also is an electrically equipped laundry room for the use of the tenants as well as a storeroom containing private lockers for each apartment. Automatic electric elevators are provided also.

Convenience outlets for small electrical appliances are numerous and the lighting fixtures are said to be of the most modern design.



The type of electric refrigerator installed in each apartment.

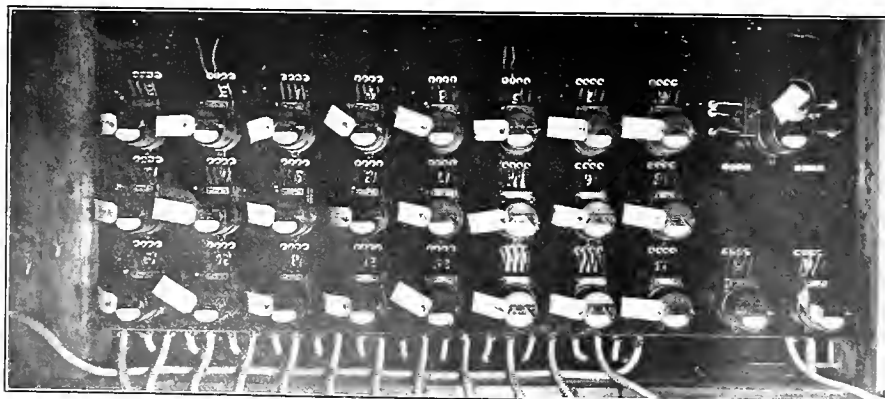
A large single board in the basement provides a place for the individual meters serving each apartment. A tag on each meter designates to which apartment the service is rendered.

The People's Electric Store of Medford, Ore., were the electrical contractors in charge of the job.

## Denver New Electrical Rules Under Advisement

The proposed new electrical working rules for the city of Denver which were prepared by a local committee representing every branch of the electrical industry, have been submitted to city officials for approval. According to an opinion expressed by the city building inspector who is reviewing the work, his examination will be completed within a short time and the manuscript will then be referred to the original code committee for such changes as may be recommended.

Contrary to the belief held in some sections, the purpose of the committee has not been to establish a new electrical ordinance but rather to prepare new electrical working rules which may be enforced under the present ordinance which gives power to the city electrician to make such rules and regulations from time to time as he may deem necessary.



Meter board containing individual meters for all apartments of the Schuler apartment building. Individual tags on each meter label the service to which the meter belongs. Flexible metal conduit was used for wire runs.



### Contractor Designs Electric Mirror for Shaving

W. B. Holland, proprietor of the Holland Electric Company, at 177 W. Center Street, Anaheim, Calif., is the inventor of an ingeniously lighted shaving mirror and medicine cabinet for use in homes.

It is an all-metal cabinet, finished in



Concealed lamps in the frame of this all-metal medicine cabinet provide illumination to all sides of the face for shaving. It was designed and patented by W. B. Holland, Electragist of Anaheim, Calif.

white porcelain. Four lamps are concealed on the inside of the cabinet around the frame holding the mirror. The light is thrown on all sides of the face after passing through diffusing glass. The mirror acts as a door to a regular medicine cabinet.

The device is patented by Mr. Holland, Electragist of Anaheim. Photographs showing the arrangement of lamps and the effect produced are shown on this page.

### Writer Explains Criticism and Offers Apology

A criticism made to a representative of the Journal of Electricity concerning statements contained in one of the "Electrical Estimating for the Contractor" series, namely No. V, published Nov. 1, 1925, pp. 340, 341, was referred to the author of this series, J. R. Wilson. The criticism was made that in Fig. 1, a 1-in. conduit with No. 6 rubber-covered wire was shown for connections to a 20-hp. motor when electrical safety orders call for 1½-in. conduit. Also in the schematic diagram of power wiring for the American Hardwood Company, on p. 341, 1-in. conduits and No. 6 wires are shown, where 1½-in. are called for in the safety orders; where 1½-in. conduit and No. 2 wires, the conduit should be 1½-in. and where shown as 1½-in. and three No. 2's, it should have been 1½-in. and three No. 2 wires.

In answer to these criticisms Mr. Wilson wrote as follows:

In answer to a criticism which has reached the writer, the tables of allowances for Los Angeles differ somewhat from the allowances given in the state safety orders. The tables are those used for the installation of conduits and wires in Los Angeles as allowed by the local code rules.

The particular criticism referred to herein pertains to the article appearing Nov. 1, 1925, which described an industrial installation made under supervision of the writer. As the preliminary estimate was submitted against price competition it is but natural that advantage was taken of the local code allowances so that this estimate would be in line.

The same criticism previously had been called to the writer's attention by Mr. Evans of the Board of Underwriters of the Pacific. At his request many of the later articles carried the line "Los Angeles Code." The writer is extremely sorry if the article first mentioned has led to confusion.

J. R. WILSON.

### Governor Operates Control on Newspaper Compressors

A departure in control methods was made by C. C. Clardy, San Diego Electragist, not long ago, in the installation of equipment to operate air compressors used in connection with the newspaper plant of the San Diego Union and Evening Tribune.

Three 35-cu.ft. compressors are used, connected to type C.P.I. General Electric Co. 3-phase, 220-volt motors of the interlocked type. An M.L. General Electric railway governor operates the control circuit which in turn operates the magnetic switch. Double-throw switches allow operation either on the governor or the whole battery of compressors. The control circuit is wired so that any individual compressor may be thrown on or off. This is valuable from the reliability standpoint, particularly when one governor or compressor is not being used or is being repaired. Each compressor is equipped with a dirt collector.

An automatic release relieves the pressure in the cylinder while starting. This is operated by solenoid, interlocked with the control circuit. The switch at the left in the photograph is a magnetic switch.

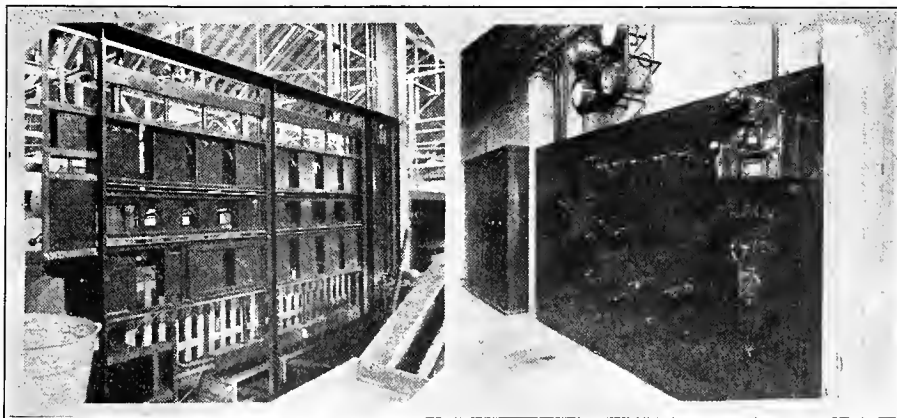
A gutter was installed because of the accessibility and because it im-



A railway governor operates the control circuit in this installation of air compressors in a San Diego newspaper plant.

proved the looks of the installation. Three compressors are installed. One is used as a standby. The compressor used as a standby is rotated in order to equalize the amount of service on each compressor.

The installation was designed and installed by C. C. Clardy, Electragist of San Diego.



Heavy angle-iron framework of distribution panel before the wall was poured around the board.

## Question Box

Arrangements have been made to answer through the columns of the Journal of Electricity such questions on electrical construction and other subjects as are of general interest. Inquiries should be directed to 883 Mission Street, San Francisco.

Q. 7. What is the formula for expressing power lost on d.c. lines?—M.T.C.

A.  $W = C \times I$   
Where: W = watts  
C = volts drop  
I = current flowing

Q. 8. What are weights per mile of No. 8 to No. 14 T.B. weatherproof iron wire?—J.A.K.

A. No. 8, 470 lb. (average). No. 9, 400 lb. (average). No. 10, 350 lb. (average). No. 12, 230 lb. (average). No. 14, 150 lb. (average).

Q. 18. What solution can be used in a home-made polarity indicator?—E.S.G.

A. Iodide of potassium dissolved in glycerine.

### Walled-in Switchboard Allows Access from Rear

Although seemingly imbedded in the wall of concrete, a recent installation of a distribution switchboard made by the Granger-Dacus Electric Company, Electragists of Ontario, Calif., for the West Ontario Citrus Association, is well provided for easy access as well as for future growth of the electrical demands of the association.

The distribution panel in this installation was made of heavy angle iron. An opening was left in the concrete wall to accommodate the main distribution board. An iron door on the rear made of 14-gage iron allows the power company to test without interrupting the service. The doors open toward the back. Space was left in making the original installation to take care of future additions to the plant. This will be seen in the picture. The board faces the engine room and really fits in between walls so that the rear of the board is in the adjoining room.

Completed board and wall. Access to rear of the board is possible from the adjoining room, allowing tests without interrupting service.

## Answers to Questions on N.E. Code

**Q.** Is it a violation of the National Electrical code to use an E conduit as an entrance fitting if properly installed?

**A.** A conduit fitting which has been listed as "standard" by Underwriters' Laboratories and is of a type similar to that known as an "E conduit" may be used as a conduit service entrance fitting if installed so that the porcelain cover is on the lower side and the wires are in a vertical position where entering the cover. However, for the larger sizes and where conductors are not stranded, to prevent possible abrasion of the wire insulation and covering it is preferable and advisable to use a fitting of a type having a removable cap which permits the wires to be drawn into the conduit easier and with less likelihood of injury to the wire covering.

**Q.** Order 716-4-a of the Electrical Safety Orders calls for all conductors on the outside of signs to be installed in rigid metal conduit or in weather-proof metal wireways. Some inspection departments are permitting a short piece of open wiring extending from the conduit or metal raceway to the sign letter and others insist upon the conduit or raceway extending into the letter, which involves quite a job in the repair of a letter. In the case of a roof sign the short pigtail can be cut, the letter removed, lowered to the roof, repaired, and then replaced. Otherwise it involves a soldering job to open the letter so it can be removed and another to replace it, which has to be done on the frame supporting the sign letters.

**A.** The above method of connecting to the individual letters on signs is approved by this department if the outlets are properly bushed and assembled, so that rain water will not enter the sign letters or the conduit, and the taps are made as short as practicable.

**Q.** Does all power wiring, regardless of voltage, have to be installed in conduit?

**A.** Electrical Safety Orders 711-4 (a) and 711-2(b) require all low potential motor installations to be made in conduit (rigid or flexible), metal armored cable, metal raceway, or metal gutter with the following exceptions:

(1) Where the difference of potential between any two conductors of the circuit does not exceed 300 volts and the conductors are not larger than No. 10, knob and tube wiring may be used in concealed locations; but in such

cases the wiring from the outlet to the motor and control equipment shall be in conduit, metal armor, metal raceway, or metal gutter, as above required, unless the omission thereof is permissible under the following exceptions:

(2) Metal armor will not be required on the flexible portable conductors to portable motors operating at not over 600 volts to ground. In all cases the flexible cable or cord used shall be of a type specially approved for use under the conditions to which it will be subjected.

(3) In substations, motor wiring may be installed in compliance with the requirements for the protection of conductors, as given in the orders applying to substations.

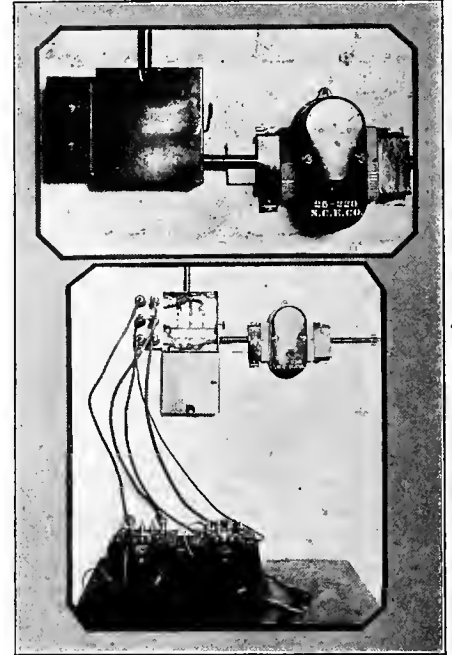
(4) Open wiring may be used for motor wiring when the voltage does not exceed 600 volts and the conductors are not smaller in size than No. 0, subject to the restrictions of Order 703-10.

**Cotton Raisers Find New Use for Electric Light.**—Since cotton is now to be considered as one of the regular crops of San Joaquin and Imperial valleys, a new use for electric lighting may be of interest and profit to electrical contractors operating in such territory. J. A. Partridge, a cotton raiser near Tornillo, Texas, has devised a way of ridding his fields of the ravages of the cotton moth. Electric lights have been strung along each row of his cotton plants. At night these are illuminated and the light attracts countless millers. The millers strike the lights and fall into cans containing kerosene conveniently placed beneath each light. Thus the millers are exterminated before having a chance to lay the eggs from which are hatched the worms that destroy the leaves of the cotton plant. The idea holds possibilities for use in combating other forms of insects also.

**Vault Telephones Required in Chicago.**—Telephones will soon be installed in every bank vault in the city of Chicago if an ordinance recently introduced into the city council is approved. The action was taken because of a recent accident in the city hall building when a clerk was locked in the basement vault for several hours and was almost suffocated before he was released by a night watchman after frantic pounding on the door of the vault. Had there been telephonic communication with the outside office, his release would have been immediate.

## Permanent Test Terminal Board Prevents Test Shutdowns

Although the central station cannot require that the consumer install such equipment, the use of a safety switch with permanent test terminal board installed adjacent to it has many advantages from the consumer's viewpoint. Such equipment was worked out by W. R. Frampton, superintendent



Top: Test terminal board installed adjacent to safety switch. Bottom: Test being made of lines without shut-down or danger.

ent of the test department of the Southern California Edison Company.

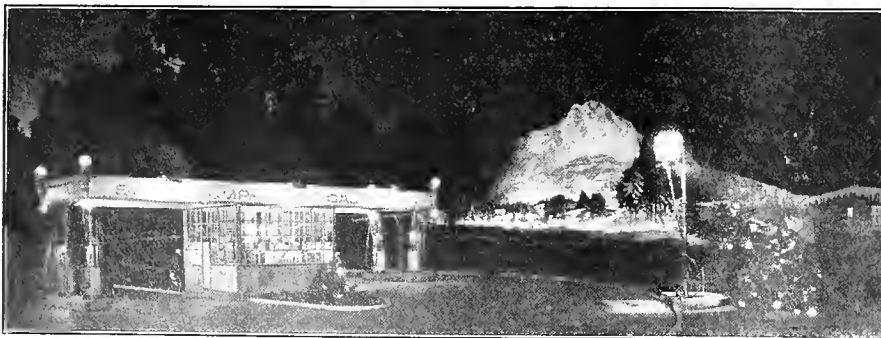
The permanent test board permits the central station test man to run a test on a consumer's meter without interrupting his service; in effect it permits the test man to shunt the current through the test meter by merely placing the meter in the line.

This apparatus was developed at a time when there was no similar apparatus on the market which would permit the central station man to run a test on a consumer's meter without shutting down the consumer's plant or subjecting himself to possible serious electrical shock and burns.

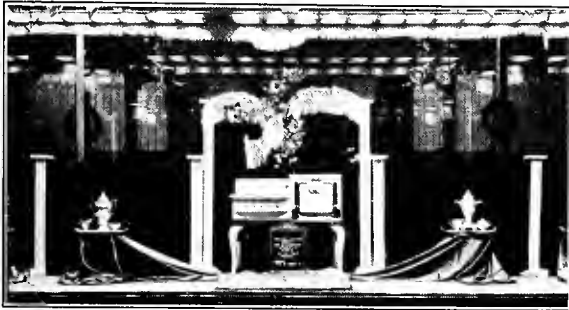
As a rule the installation of this equipment in any particular location has been borne by the consumer. In saving the customer the necessity of interruption the cost of the installation is to his own advantage.

**Santa Cruz, Calif.,** at a meeting of the city council recently, adopted a new electrical ordinance by unanimous vote. The new statute increases the annual license for persons engaged in the electrical contracting business from a previous figure of \$25 to a yearly fee of \$100 and provides for the appointment of a city electrical inspector. The ordinance was supported by the electrical contractors of the city.

The San Francisco Electrical Contractors' Association has just put out in loose leaf form a complete topical index of local, national and safety orders codes and furnished to all members of the association.



Christmas decorative lighting is now practiced by a number of oil companies. This picture is of an elaborate and effective job of decorative lighting used by the Shell Oil Company at its Fell and Stanyan Streets service station in San Francisco last year. Such installations provide attractive seasonal business.



With spot-lighting upon the range and percolator sets, this window of the Utah Power & Light Company, in Salt Lake, carries the idea, "The Electric Gift Shop."



Out of the Christmas box comes the electric range in one window of the Logan, Utah, office of the Utah Power & Light Company. The other window contains a variety of gifts.



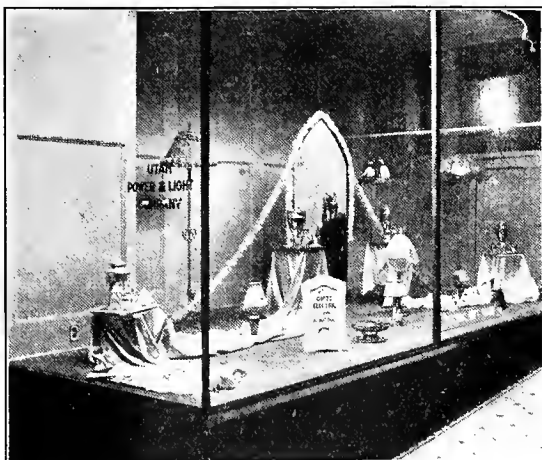
The chimney and fireplace give the right holiday touch to the window of the Lushington Electric Company of Seattle.

## Christmas

season of gift giving, is the electrical merchandiser's great opportunity of the year. How you may conduct successfully this year's campaign, based upon the successful methods of others last year, is set forth in these pages.



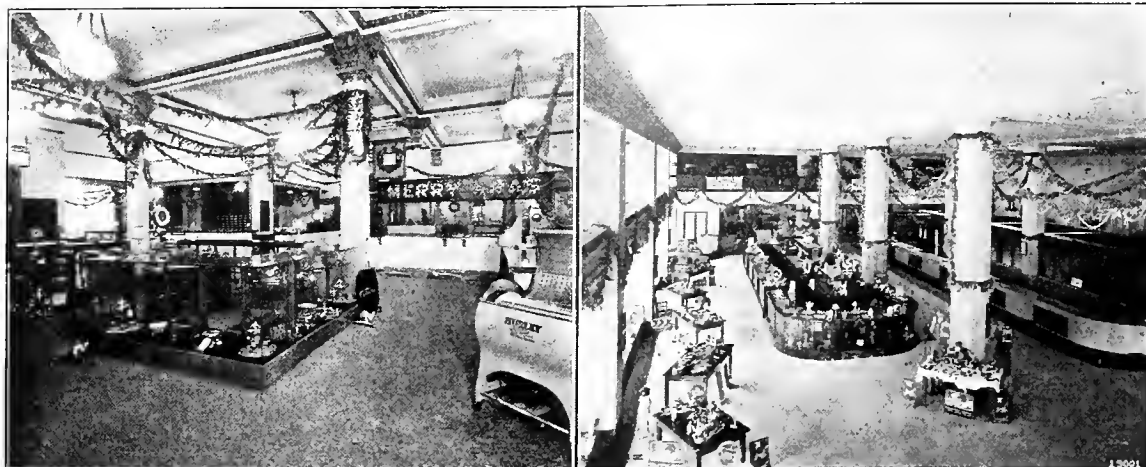
Simple and dignified in the extreme, is this striking window of the Public Service Company of Colorado.



An unusually attractive display of percolator sets, waffle irons and lamps in the Salt Lake City office of the Utah Power & Light Company.



With the display card bearing "Give Something Electrical" J. J. Agutter & Company of Seattle, Wash., made an effective display of appliances and Christmas tree lamps.



Nothing is so conducive to holiday shopping as a well decorated display room. In the picture on the left may be seen the decorations employed to good effect by the Utah Power & Light Company in its Salt Lake office. At right is the Valley Electrical Supply Company, Fresno, in its Christmas gaiety.

## Christmas Ideas That Have Paid Dividends

Are you organized for Christmas selling? Naturally Christmas is the season for greater appliance sales. But greater appliance sales require greater advertising effort. Moreover the rush of business at such a time is apt to leave the unprepared merchandiser very much up in the air on many occasions.

Be prepared for the Christmas season's merchandising. Check over these very necessary selling preparations. If you are set on all of them you can feel sure that 1926 will be a merry Christmas season for you.

**Stock**—Placed your orders yet? Estimated your requirements on sound lines?

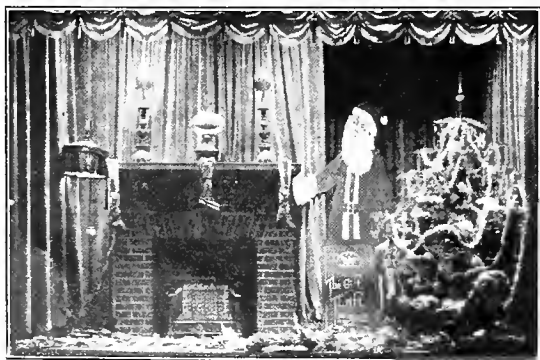
**Help**—Have you enough help to care for customers? Does the help know the stock?

**Leaders**—Have you planned leader articles at reduced prices to bring customers to the store?

**Advertising**—Planned your advertising yet? Check mailing lists, plan newspaper ads, broadsides, pamphlets, catalogs, stickers. Have you looked over dealer helps offered?

**Displays**—Decorated the store in festive dress, or planned to? Use light! You are selling light. Set an example. Make your store the city's one bright spot. Change your windows frequently. Make them sell for you.

**Deliveries**—Offer your customers Christmas Eve delivery. You can build up a strong good will on first class delivery at this time. Use decorated wrappings, too. They all have a telling effect.



That a customer-ownership share of stock makes an ideal Christmas gift is set forth in this well arranged window of the San Joaquin Light & Power Corporation.

Some of the following Christmas ideas may prove to be just the things you want. They have been successful selling methods in the past. If you can put some of them to work for you they should be equally successful in your territory.

### *The Electrical Gift Idea—How Shall It Be Sold?*

By J. U. BERRY, Advertising Manager, Valley Electrical Supply Company.

If there is any season of the year when electrical merchandise can be advertised and displayed most profitably, certainly it is at Christmas time, and the merchant who is handling electrical goods is overlooking a great opportunity when he fails to put his store in the Christmas atmosphere. No truer statement was ever made than, "Goods well displayed are half sold." Gift seekers in increasing numbers each year are carefully selecting gifts that will be of lasting usefulness. Electrical things are practical, labor-saving and most attractive. With all these in our favor, the big problem then is to give the store the Christmas atmosphere so the spirit of Christmas will be reflected to those who enter.

In planning our holiday activities, the thought uppermost in mind was to sell the electrical idea to the entire community so thoroughly that all who handle electrical merchandise might profit by our advertising and displays. Thousands of the power consumers of this district entered the store every day; not all of them bought electrical gift merchandise from us, but we feel safe in saying that many thousands had the desire created in their minds who afterwards bought elsewhere. The substantial increase in November and December business was ample justification for our efforts and expenditures.

#### *Artistic Decoration with Christmas Greenery*

Hundreds of yards of natural greenery was festooned from column to column and around the sides of our lobby. Tinsel and icicles were artistically arranged on the greenery which had already been sprayed with white, giving it a





Cleverly written and illustrated gift catalogue in which coupons are given for credit exchange on leader articles, is this booklet of the Pacific Power & Light Company. The booklet contained short descriptions of numerous appliances, together with illustrations in two colors, and gave prices of each of the articles.

very realistic frosted appearance. Large red Christmas bells were hung where the festooning crossed. A large 20-ft. Christmas tree was placed in the center of the lobby to the front, all glistening with tinsel, ornaments and colored lights.

Every foot of open window space was used to display electrical merchandise. On each unit display neat hand lettered show cards were used suggesting gifts. Back of the windows were visible at close range show cases also trimmed with Christmas tinsel and colored roping and acting as a second series of small display windows. Hundreds of people each evening parked their cars in front of the building and spent much time wandering around examining the various displays of electrical goods.

In the Radio section the front cases are the "open front notion drawer" style where all small radio parts are in plain sight of the radio fans. These, too, are displayed so as to promote Christmas buying.

Aside from the windows and interior displays, practically every avenue of advertising approach was employed. Liberal newspaper space was used, direct mail, house to house circularizing and bill-board advertising. Even our delivery and service cars carried gift suggestion signs.

### Gift Catalogue and Free Coupons Assist Sales for Pacific Power & Light

WHEN all possible electrical gifts are set forth in an attractive little catalogue, and that catalogue contains a number of coupons good for credit on certain leader articles, the Christmas appliance selling problem is in a fair way to being solved. Such at least was the experience of the Pacific Power & Light Company throughout its territory in Oregon and Idaho last year.

A well arranged pamphlet, of a size to fit into the ordinary envelope, was sent to all customers of the company. On its cover, decorated with holly and in two colors, was the admonition, "This booklet is worth \$11.25. Save it!" Within, its 24 pages were devoted to short but tempting descriptions of each of the various appliances available as Christmas gifts. Each appliance was illustrated by means of a small picture or drawing. Prices of each of the articles and of the various types, were given. The headings were printed in red ink, while the descriptions and pictures were in green ink.

A double page spread in the center of the booklet featured the Westinghouse waffle iron upon which there was to be found at the back of the book a coupon entitling the purchaser to \$5 credit. Among the items listed in the catalogue were Christmas tree lamps; breakfast sets of toaster, percolator, creamer and sugar bowl; traveling iron sets, grilles, waffle irons, electric ranges, headlight heaters, curling irons, heating pads, toasters, percolator sets, oven cookers, cigar lighters, washing machines, irons, ironers, portable lamps of many kinds, and vacuum cleaners.

The last page consisted of five coupons, each one good for a specified amount in payment for a specific electric appliance listed in the catalogue. These coupons proved to be the effective touch which kept the catalogue from going the way of all such literature, into the wastebasket. Experience proved that the catalogue was kept in the household and that many sales were traceable directly to the coupons. Those who came in to buy the featured appliance for which the coupon was given as part payment often decided upon other grades of merchandise. Many who came to buy only the "special" bought other appliances as well.

The catalogue idea is by no means new or untied. Millions of dollars worth of merchandise are sold every year by means of catalogues. The mail order houses demonstrate this fact. The electrical merchandiser can well afford to borrow this well established advertising method from the mail order house and turn it into cash.



A well balanced display (left) in the windows of the Ogden, Utah, office of the Utah Power & Light Company. Center: an attractive small window display at the Park City, Utah, office of the same company. At right is one of the windows used throughout the territory served by the Pacific Power & Light Company, of Portland, Ore., during its Christmas campaign.

# Airplane Brings Santa Claus in Colorado

Broadsides and Gift Certificates Distributed from Airplane  
Boost Sales Throughout Territory

**I**NTRODUCING Santa Claus to the populace via the airplane route and bombing seven cities in northern Colorado with cash and merchandise gift certificates, the western sales division of the Public Service Company of Colorado scored what is popularly termed a knockout in the way of an advertising novelty just prior to Christmas last year.

This deft stroke of unconventional publicity bordering on the realm of the circus stunt turned an immediate profit in electrical merchandising and brought inestimable dividends in institutional advertising.

It was the feature number of several sales maneuvers that assisted the division in breaking all records for total merchandise sales during one month. Not only was a new high mark set, but it was hung up among the clouds, exceeding by over 50 per cent the best previous total in the same territory. December likewise drew down the curtain on a record year.

## Santa Rides His Air Sleigh

Leaving Denver under the hand of a professional flyer, the plane winged its way northward on Dec. 19, covering the cities of Boulder, Longmont, Loveland, Berthoud, Louisville, Lafayette, Windsor and Fort Collins, making a landing at the last named place.

Riding in the forward cockpit and garbed in traditional Kris Kringle fashion was Virgil Stone, employee of the company's budget department. Describing three circles over each city visited, the aviators dropped specially prepared broadsides devoted to the holiday merchandise offered by the local sales offices of the company.

Each of the pieces of advertising literature was separately folded. Attached to a certain number of them were certificates entitling the

receivers to percolator sets, electric curling irons or other articles of merchandise when presented at the local office of the Public Service Company. In addition, each broadside contained a cash certificate good for the amount stated if applied on the purchase of some electrical Christmas gift named thereon.

At Fort Collins, where a landing was made, Santa Claus repaired to the front of the company office. There from a box fashioned to represent a chimney, he drew forth 250 sacks of candy, distributing them to the children as they filed past him.

## Despite Delay People Await Plane

The interest shown by the residents of the cities visited was beyond even the fondest hopes of the promoters of the flight. Virtually the entire population of each city turned out to watch for the plane and to scramble for the gift certificates.

It so happened that circumstances beyond the control of the company delayed the flight long after the time scheduled so that when they finally circled over the first of the cities on their route they were more than two hours behind time. Notwithstanding the delays, however, the people waited. In Loveland, where the plane was due shortly after noon, the streets in the business district were thronged to the point of congestion half an hour before the announced time of the plane's arrival. When it failed to put in an appearance, practically the entire assemblage waited.

## Well Planned Publicity

Advance publicity on the stunt was started on Dec. 17, two days previous to the date scheduled. It consisted of a "teaser" advertisement in daily

Outside cover of broadside, as well as handbill and free gift certificate dropped by the Santa Claus airplane in its tour over Colorado towns served by the Public Service Company of Colorado, last Christmas.



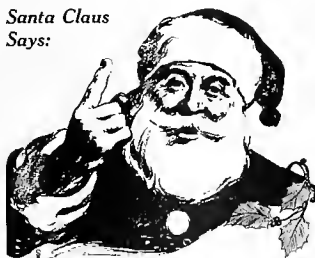
A Gift  
from  
Santa Claus

and his  
Christmas  
Aeroplane



Look Inside for It!

Santa Claus  
Says:



DEAR FRIENDS:

It is such a short time until Christmas that I have decided to use an aeroplane to visit you and tell you about the wonderful gifts that can be found in the stores of the Public Service Company of Colorado. Electrical gifts—gifts for every member of the family—and gifts that are meant for long years of usefulness and beauty. I want you to be sure and see them, and so I am offering, as an added inducement with the special holiday prices and easy payment terms, a number of free gift certificates good in any Public Service Company store, and the bonus valued. Look inside to see if Santa Claus put a gift certificate there for you. Surely you will find a great number of Christmas gift suggestions this year as early and in a Public Service store.

Public Service Company of Colorado

Christmas Gift Certificate  
Redemption of this certificate for the value of the Public Service Company merchandise named thereon is good until January 1, 1930.  
Public Service Company of Colorado

Watch for the  
Christmas Aeroplane  
Santa Claus  
will fly over this town on  
Saturday Afternoon, Dec. 19

He will drop messages that will contain  
free gift certificates. Be sure to watch  
for the aeroplane and open every mes-  
sage to see if you get a gift certi-  
ficate. They're worth money.

Public Service Co. of Colorado



Santa Claus arriving by airplane in the territory of the Public Service Company of Colorado. Thousands watched the skies for Santa upon the company's announcement. Broad-sides and gift certificates were dropped from the plane.

papers in each of the cities. "Watch for the Christmas aeroplane Saturday afternoon, Dec. 19, 1925," was all that each display space contained.

On Friday the papers carried a news story announcing details of the plan. Most of them gave front page space with two-column heads. On the same day dodgers were distributed to each house in all the cities. Newspaper display ads likewise carried the detailed message of the flight. An average of 20 column inches was devoted to each display ad run the day before the flight.

As a stimulus to Christmas business alone, the stunt was well worth while, to say nothing of its effect on future sales and its good will aspect.

#### Results Exceed Most Sanguine Hopes

For instance, in Loveland, a city of 3,500 persons which has a municipal lighting system, merchandise sales on the day of the flight totaled \$1,000. The company recently contested the legal right of the city to establish its own plant and the feeling toward it was not supposed to be the best. However, the flight brought the people out in surprising numbers and practically all of them visited the company store and became either actual or prospective customers.

In Fort Collins the sale of three washing machines was traced directly to the fact that the buyers had brought their children to the store to receive free candy. In Boulder a man called at the store to look at a \$1.98 lamp which he saw advertised in the broadside. He became interested in an electric suction sweeper and purchased it, leaving his check for \$65 in addition to taking the lamp.

#### Cost Was Very Nominal

The cost of the stunt to the company was very nominal. Total outlay was approximately \$355, or a little more than \$50 to the city covered. The items of expense were compiled as follows: Aeroplane and pilot, \$90; merchandise, \$65; newspaper advertising, \$65; printing of broadsides, dodgers and gift certificates, \$61; clearing landing field at Fort Collins of snow, \$15; candy, \$30; miscellaneous, \$30.

The cost of most of the merchandise given away was defrayed by manufacturers who co-operated on the plan. Chief among these were the Westinghouse Electric & Manufacturing

Company, Mountain Electric Company, New Home Sewing Machine Company and the Automatic Electric Washer Company.

The idea was suggested by Ed. Rowland, manager of electric sales in the district. Details were worked out by him and E. K. Hartzell, in charge of publicity and advertising for the district. All copy, including news stories for the various papers, was personally prepared by the latter.

#### Good Will Results from Stunt

The enterprise is notable not only for its results, but also as demonstrating that even a staid, conservative organization can profit at times by overstepping established policies and adopting the spectacular and unusual in the way of a sales promotion scheme.

"The stunt was perhaps the most successful we have ever employed, considering the low cost and the outstanding results obtained," stated Rowland. "Also, as far as my knowledge goes, it was unique so far as central station exploitation is concerned."

There is yet another angle to be considered in summing up the results. An immense amount of good will for the company on the part of the merchants in the cities covered was harvested. By calling out goodly portions of the populations, business sections were crowded and retail stores in all lines handling gift articles reported sales far above normal for the day. A check showed that approximately 80 per cent of the gift certificates dropped from the plane were recovered and presented at company offices.



The Rocky Mountain section has made a great success of its outdoor Christmas decoration and illumination campaigns. This is the county hall of Boulder, Colo., and the city's official electrically lighted live Christmas evergreen tree.

# NEWS OF THE INDUSTRY

## Oakland, Calif., Plans Special Street-Lighting System

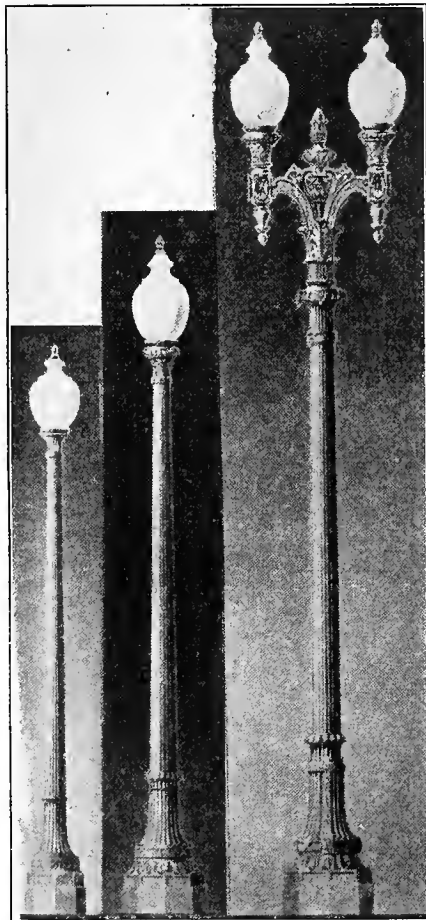
A resolution approving plans and specifications for a specially designed street-lighting system for the downtown district of the city of Oakland, Calif., recently was passed unanimously by the city council.

The plans provide for 353 steel ornamental electroliers, each to be equipped with two 1,500-cp. units, or a total of 3,000 cp. for each standard. Each 1,500-cp., 20-amp. series lamp will be operated from an individual lamp

The lighting system has been devised entirely by the city's electrical department, under the direction of Carl Hardy, superintendent, and in connection with it the family of standards shown in the accompanying photograph has been adopted for uniform street lighting. The two-light standards shown are the ones that will be used in the downtown district. The single-light standards will be used in future installations of ornamental lighting on residential streets, boulevards and secondary business streets. The standards will be manufactured in Oakland, and lighting equipment and glassware will be furnished by the General Electric Company.

After the customary meeting of the council to hear protests is held, bids will be called for and contracts awarded. It is expected that the system will be in operation within from six to eight months.

**Plans Ordered for Modesto Irrigation District Substation.**—Preparation of plans for the 9,000-kw. substation to be built by the Modesto Irrigation District has been ordered by the district. The station will handle the power received from the Hetch Hetchy plant of San Francisco under the terms of the recent agreement between that city and the irrigation district (*Journal of Electricity*, Nov. 1, 1926, p. 346), and will be built at a point in the district adjacent to the Moccasin-Newark transmission line.



Family of standards adopted by the city of Oakland, Calif., for a uniform street-lighting system.

transformer in the base of the standard. Two of these individual lamp transformers will be in the base of each standard; they will insulate the standard from the high-voltage underground series circuit, and the only voltage above ground will be that of one lamp, which is less than 100 volts. All of the latest safety features have been incorporated in the specifications. The electroliers will be 20 ft. in height, and will be spaced 100 ft. apart.

## Two Well Known Engineers Open Offices as Consultants

Under the name of Engineering Service Company R. W. Shoemaker and M. M. McIntire have opened offices at Room 518 Oakland Bank Building, Oakland, Calif., as consulting engineers. The firm is interested primarily in the industrial application of electricity and the municipally owned and publicly owned power and irrigation projects and in steam and hydraulic problems as well as electrical.

Both men are well fitted for the undertaking. R. W. Shoemaker, the senior partner, is a man of wide experience, both in California and in the Middle West in mine and power work. For the past four years he has been electrical engineer for the Turlock Irrigation District and at the same time acted as electrical engineer for the Merced Irrigation district during the construction of its Exchequer dam and power house. Mr. Shoemaker is a member of the American Institute of Electrical Engineers.

Mr. McIntire has been associated with Mr. Shoemaker as his assistant in the design and construction of two plants for the Turlock district and also the Merced district's plant. He was superintendent of construction for the Turlock district's La Grange plant and was superintendent in active charge of construction on the Exchequer plant of the Merced Irrigation district. Mr. McIntire is an associate member of the A.I.E.E.

## California and Oregon Defeat Measures to Engage Them in Power Business

The voters of California and Oregon definitely have refused to allow those states to engage in the development and sale of hydroelectric energy.

For the third time the California Water and Power Act, the initiative measure designed to put the state in the power business, was defeated decisively at the general election held Nov. 2. Final returns have not been announced but as this paper goes to press the indications are that the majority against the measure will exceed 350,000, or a ratio of 2.5 to 1 as against 2.35 to 1 in 1924, and 2.45 to 1 in 1922.

In San Francisco the vote against the proposed amendment to the state constitution was 2 to 1, but it was more nearly 3 to 1 in Los Angeles where it was feared that the measure, if passed, would affect adversely the projected Boulder Canyon Dam.

Under the provisions of the proposed act the state would be bonded for \$500,000,000 and a board of five members created with power to ex-

pend funds up to this sum for the purpose of acquiring or constructing power plants, transmission systems and distribution facilities for the sale of electrical energy to the public.

In Oregon the so-called Housewives' Bill, a proposed constitutional amendment designed for the same purpose as the California measure, was defeated by a vote of 4 to 1, according to latest reports, which give the figures as 35,465 for and 142,023 against. There was a marked similarity in the two measures, the principal differences being that the members of the proposed board of five were named in the Oregon act, that instead of stating a definite amount for the bonds it specified that bonds might be issued up to 5 per cent of the assessed valuation of the state, at the present time this 5 per cent amounting to \$52,944,000, and that it stipulated that any expenditure of more than \$500,000 for a single plant must be approved by the voters of the state at a general election.



## State Engineer of Wyoming Is Elected Governor

Among the recent gubernatorial elections interest attaches to the fact that a state engineer was elected governor and a governor who had been a state engineer was defeated.

Frank G. Emerson, who has been state engineer of Wyoming for the past six years, was elected governor of that state, defeating Governor Nellie Tayloe Ross, while Gov. James G. Scrugham of Nevada, formerly dean of the college of engineering of the University of Nevada and state engineer during 1917-1923, was defeated by Fred Balzar. Governor Schugham served as Nevada agent and signatory to the Colorado River Compact.

In Arizona there is a possibility of a recount of votes for governor. Late press reports state that Gov. G. W. P. Hunt was leading his opponent by about 285 votes with approximately 90 votes in two counties unreported and a dispute centering around 100 votes credited to Governor Hunt. Governor Hunt, who has held office for several terms, has been the leader of Arizona's opposition to the Colorado River Compact.

## Charges Against Utility Not Substantiated at Hearing

Branding the charge that the Portland Electric Power Company, Portland, had paid to the Portland Oregonian \$35,000 to help defeat Senator R. N. Stanfield, independent candidate for re-election to the United States Senate from Oregon, as "an unqualified and outrageous falsehood," Edgar B. Piper, editor of the Oregonian, made a complete denial that that newspaper was connected in any way with such a transaction. Mr. Piper's testimony featured the first day of the investigation of the charge conducted by Senator Charles P. McNary of Oregon, a member of the senate investigating committee, at the request of Senator James A. Reed of Missouri, chairman of that committee. The hearing was held at Portland Oct. 27-28, 1926.

Further unqualified denial of the charge was made by Franklin T. Griffith, president, Portland Electric Power Company, Portland, and C. M. Clark, chairman of the board of the company, Philadelphia, who at the time the charge was made public, Oct. 25, were traveling together in California and who returned to Portland immediately to present their testimony at the hearing.

The investigation was ordered by Senator Reed on receipt of what appeared to be competent evidence furnished him by George Putnam, editor of the Capital Journal, Salem, Ore. Mr. Putnam has informed Senator Reed that he had good authority for the statement that the Portland Electric Power Company, through Mr. Griffith, had paid \$35,000, of which \$25,000 had come from the Philadelphia office, to the Oregonian in the interest of defeating Senator Stanfield and in behalf of the candidacy of Frederick Steiwer, regular Republican nominee. The hearing developed that the "good authority" was Walter Hayes, Washington, D. C., who was supposed to have brought the information to Salem and told it to Messrs. Putnam, Stanfield and others, and a conversation overheard in the coffee shop of the Davenport Hotel, Spokane, in which

James Stone, manager, Spokane Gas & Fuel Company, Spokane, was alleged to have repeated a substantially similar story to a luncheon companion. Neither Mr. Hayes nor Mr. Stone were able to be present at the hearing, but telegrams received from both by Senator McNary and read into the record of the hearing made sweeping denials of knowledge of any such conversations as were credited to them.

## Bungalow-Type Substations for Residential Sections

The first two of the bungalow-type substation for residential sections have been placed in service by the Southern California Edison Company. This new bungalow-type is of Spanish architecture, finished in white stucco and with a red tile roof over a portion of it. The high-voltage equipment is outdoors but is surrounded by a high wall which gives the impression of being part of the house and of having a flat roof. The roofed portion of the structure contains the 4-kv. switches, regulator and other equipment.

One of the new substations is Ramona and is located near the southern boundary of the city of Alhambra, serving a portion of that city and also the city of Monterey Park. The other is Charnock substation, which serves a rapidly growing territory between Santa Monica and Culver City.

These two substations are practically identical, each having a capacity of 1,500 kva. Each is fed by two 16-kv. circuits which enter the building underground. The three 4-kv. feeders and a controlled street-lighting primary leave underground from each station. All 4-kv. equipment is automatic reclosing. At present there is only one regulator for bus regulation; later, however, more circuits can be added and a regulator provided for each circuit, if desired.

The new substation in Pomona also has been placed in operation recently. Although situated in an industrial section of the city, a very pleasing building of buff brick with a red tile roof houses the 4-kv. equipment and 11-kv. metering and controls. The 11-kv. switches and transformers are outdoors. At present the station has a capacity of 3,000 kva. and can be fed from four 11-kv. circuits. There are four 4-kv. outgoing feeders which are separately regulated, and one two-schedule control primary for street lights. All circuits into and out of the station are underground for some distance. The 4-kv. circuits are planned in such a way that the present underground will be a part of the system which is to be constructed in the business district in the near future.

## Supreme Court to Review Chelan Condemnation Proceedings

On application of the Chelan Electric Company, Chelan, Wash., which is preparing for the construction of a large hydroelectric power project on the Chelan River, a writ of certiorari has been issued by the state supreme court for a review of the water rights adjudication proceedings in the Chelan County court, in which Judge W. O. Parr denied the application for condemnation and dismissed the proceedings. The proposed power project is to furnish a large part of the power for the Great Northern Railway in the electrification of its new tunnel through the Cascades. The Chelan court is directed by the order to certify a transcript of the records and proceedings in the case to the supreme court on or before Nov. 20.

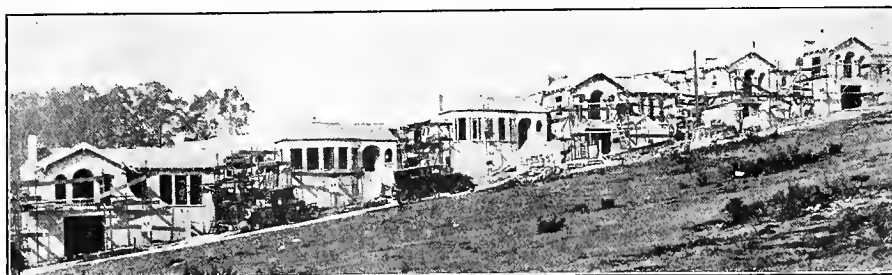
The company brought the action against Oscar Getty and other persons and corporations owning land along Chelan Lake and River, seeking the right to condemn land to permit its being flooded in the impounding of waters of the lake and river to a height of 700 ft. above sea level. The superior court on Sept. 25 held that as only 15 per cent of the power to be generated by the power project would be employed in public use the electric company was not entitled to adjudication on the ground of public use and necessity.

## Entire City Made Into District for Lighting Purposes

The citizens of Oceanside, Calif., a city of less than 5,000 population, have made a lighting district of the entire city in an effort to light it in a way that apparently they were not able to finance through the regular tax fund.

A contract has been entered into with the San Diego Consolidated Gas & Electric Company to install 142 600-cp. series incandescent street lamps. This will provide a 600-cp. lamp at every street intersection in Oceanside, except in the ornamental lighting district where 56 400-cp. units have been installed. Approval of this assessment arrangement was general among the citizens of the city, as was evidenced by the fact that not one protest was made against the plan. The cost to property owners for the work is a little less than four dollars per lot per year, the average lot being 50 x 150.

Other extensive improvements are under way in the city, including a new \$100,000 pier and promenade along the ocean front for a distance of approximately a mile and a half. On the promenade sixty 400-cp. ornamental lighting standards will be installed.



A group of Red Seal homes being built in a residential tract west of Twin Peaks in San Francisco by A. J. Herzig. Eventually there will be in that particular district one hundred and fifty Red Seal homes, of which Mr. Herzig is building twenty.

### Fifth Transbay Cable Laid by Great Western Company

The fifth submarine cable of the Great Western Power Company of California across San Francisco Bay was laid Oct. 14. This 11,000-volt cable, stretching from Pier 39 in San Francisco to Point Isabel on the Contra Costa shore, is 41,000 ft. long, is 4¼ in. in diameter and has a capacity of 12,000 kw. The cost of the cable and the necessary equipment and tie lines at each shore end is estimated to be more than \$275,000.

The cable, manufactured by the American Steel & Wire Company, was shipped to San Francisco from the factory in the East in eight cars, and upon arrival was spliced into one length and placed upon a barge preparatory to its being laid.

### McGraw Awards to Manufacturer and Jobber Announced

The James H. McGraw manufacturers' medal and purse for 1926 was awarded to Clarence L. Collens, president, Reliance Electric and Engineering Company of Cleveland, at the recent meeting of the Apparatus Division of the National Electrical Manufacturers' Association. The award was conferred upon Mr. Collens for his services as president of the Electric Power Club in effecting a solution of the long-standing controversy over temperature ratings in electric motors and in reconciling this adopted standard with the viewpoint of the National Electric Light Association, and, as chairman of the Electrical Manufacturers' Council, in carrying to successful consummation the movement he initiated to effect the organization of a single industry association to embrace the membership of the Electrical Manufacturers' Council, the Electric Power Club and the Associated Manufacturers of Electrical Supplies that resulted in the formation of the National Electrical Manufacturers' Association.

At the second annual presentation of the McGraw award to electrical jobbers, which was a feature of the convention of the Electrical Supply Jobbers Association held recently at Atlantic City, certificates of honorable mention were extended to four prominent jobber executives in recognition of distinguished service to the electrical jobbing industry. The medal and purse were withheld this year, however, because in the opinion of the judges no definite outstanding contribution to the advancement of the jobbing industry worthy of the McGraw medal was recorded during the year 1925.

The four certificates of honorable mention were extended to Thomas J. Creaghead, president, Creaghead Engineering Company, Cincinnati, for his work in connection with the National Electrical Code, of which he has become the recognized authority and interpreter to the jobbing industry; to Harry F. Thomas, president, Northwestern Electric Equipment Company, St. Paul, who has become an authority on the broad principles of cost accounting for the supply jobber as the result of continued study of the statistics of distribution in the electrical industry; to Warren I. Bickford, secretary and treasurer, Iron City Electric Company, Pittsburgh, for his work in the reorganization and executive direction of the E.S.J.A. catalog com-

mittee's project to provide for the benefit of jobbers and their customers improved methods and enlarged facilities for cataloging electrical supplies; to William S. Berry, manager Graybar Electric Company, San Francisco, "for twenty years or more a consistent and tireless worker for the encouragement of high ideals of service among the electrical jobbing fraternity of the Pacific Coast, in recognition of his splendid record of constructive contribution to the jobbing branch of the electrical industry."

The James H. McGraw award was established by Mr. McGraw "to encourage constructive thinking for the advancement of the electrical industry."

### Firm Erects Building to Care for Increased Business

A steady increase in the business of A. H. Cox & Company, Inc., electrical jobbers of Seattle, resulted in the need for larger quarters, and the demand has been met by the erection of a building at 1757 First Avenue South designed to meet the growing requirements of the business. The new premises have been occupied by the firm since May 1, 1926.

The new building has 10,000 ft. of well lighted main-floor display space served by overhead crane and with rail facilities in the rear of the building. A mezzanine floor of 1,500-ft. area is used for office purposes. The new quarters are used for display purposes only, the shop and all surplus stock being housed in a building on Utah Street.

The business was started in 1912 by A. H. Cox and was operated by him until 1916 when the firm was incorporated with a capital stock of \$20,000 with A. H. Cox as president, R. W. Thompson, vice-president, and W. E. Cox secretary and treasurer. The company moved into business quarters at

### Recent Applications Filed for California Water Rights

The following applications recently were filed with the California Division of Water Rights:

By the American River Water & Power Company, c/o Fred Dewhurst, 4444 Moraga Avenue, Oakland, Calif., for 200 sec.-ft. and 50,000 acre-ft. per annum from the North Fork of the American River tributary to the American River to be used for a proposed power project estimated to cost \$1,000,000; by the Red River Lumber Company, c/o J. H. Hunter, Westwood, Calif., for 150 sec.-ft. from Mill Creek tributary to the Sacramento River to be used for power purposes; by the American River Hydro Electric Company, c/o S. E. Kieffer, 57 Post Street, San Francisco, for 2,000 sec.-ft. and 320,000 acre-ft. per annum from the American River tributary to the Sacramento River, to be used for a proposed power project in the development of 45,227 theoretical horsepower at an estimated cost of \$7,000,000.

The division has issued to The Nevada California Power Company, Riverside, Calif., permit for the diversion of 30 sec.-ft. from Leevining Creek for power purposes. The cost of the project will be approximately \$1,170,022.

### Utility Announces Winners of Women's Essay Contest

One of the activities of the Women's Co-operative Association of the central district, Puget Sound Power & Light Company, Seattle, was an essay contest designed to rouse the interest of its women employees in the problems of the electrical industry and of the Puget Sound company in particular. Substantial prizes were offered by R. M. Boykin, manager central district, for the three best essays.



Grass and shrubbery make particularly attractive the building erected by A. H. Cox & Company, Inc., electrical jobbers, of Seattle, for stock display purposes.

309 First Avenue South, later moving to 307 First Avenue South. In March, 1918, the interest of R. W. Thompson in the business was purchased by A. H. Cox and W. E. Cox. In 1919 W. E. Cox retired from active participation in the business and H. W. Higman was elected secretary and treasurer of the corporation.

The winners recently were announced as follows: first, Dorothy Middleton, sales department, "Exit the Ox-Woman;" second, Elizabeth Ziegler, "Organization;" and third, Ruby Hollenbeck, secretary to the manager, "Load Building and Public Relations, and the Women's Co-operative Association."

## Proposed Franchise Submitted to Denver by Public Service Company

The Public Service Company of Colorado, Denver, has submitted to the city a proposed franchise, rate ordinance, standards for gas and electric service, and a contract for street lighting. The company's previous franchise expired May 15 of this year.

The new franchise provides that the company shall co-operate with the city in investigating the economic possibilities of hydroelectric power incident to the water-supply development for the city, and states that, in the event the city develops a plan including the production of hydro power, the company agrees to purchase such power in an amount and kind to the extent that its market can absorb. The price to be paid shall be equal to the cost to the company of supplying power of the same kind by other means.

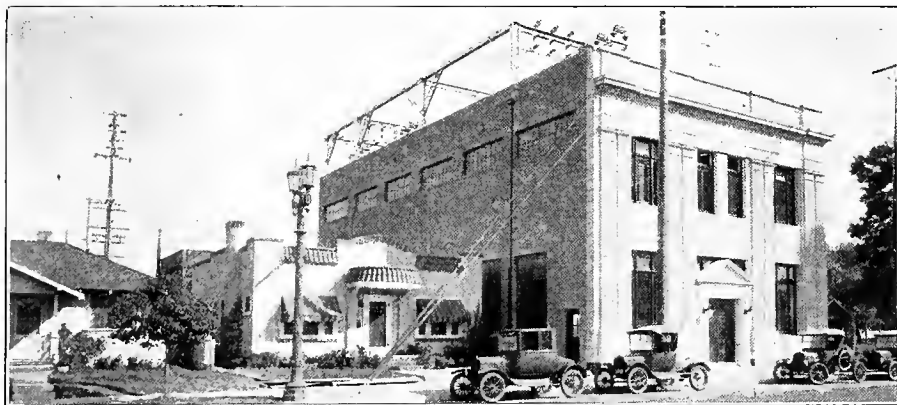
Proposed rates for domestic electric and gas service are incorporated in the new franchise proper. Rates for other classes of service are submitted in a separate document, to be filed with the city clerk in advance of the franchise election. It is provided that rates for service other than domestic may be changed during the life of the franchise "by concurrence of the company and the city council." Both the proposed domestic gas and electric rates are based on the Wright demand rates which are considerably lower than the rates now in effect in Denver. The company estimates that the new rates submitted to the city, if adopted by the people, will effect a saving to the consumers of approximately \$350,000 a year.

The new commercial lighting rate is graduated according to consumption, ranging from 7.5 cents per kw-hr. to 1.35 cents per kw-hr. The present rate for this service ranges from 8 cents to 0.35 cents per kw-hr.

Under the old franchise the company paid annually to the city a \$50,000 franchise tax. This provision has not been made in the new proposal, but rather the company calls attention to this omission in the following words: "Provision for a franchise tax has purposely been omitted for the reason that we believe it better to give to the consumers the benefit of the amount which has heretofore been paid to the city. This matter we will be glad to discuss at the forthcoming public meetings."

Though the company submitted its proposed franchise to the city on Oct. 18 and it was believed that public hearings would be held shortly afterwards, considerable opposition arose regarding the desirability of such procedure because of the fact that the engineers hired by the city to determine the value of the company's holdings had not completed their report. This investigation, covering a period of nine months and costing the taxpayers of Denver \$60,000, was completed Nov. 3, and the report made public. Comments on the company's service and other matters of general interest were likewise included. The city's engineers placed a valuation of \$30,995,767 on the company's property that is used for the supplying of electricity and gas to Denver consumers. Company officials, in commenting on the report of the city's engineers, de-

clared that they did not agree with the valuation totals, believing that the engineers have left out of their calculations a number of plants necessary for an uninterrupted supply of service to the city of Denver. The company also has stated that the city's experts have allowed a lesser valuation on certain properties than have been fixed by the federal courts. The company's valua-



This new substation at 5518 South Western Avenue, Los Angeles, recently was put into service by the Los Angeles Gas and Electric Corporation. Built for an ultimate capacity of three 5,000-kva. transformer banks and fifteen 1,000-kva. circuits, the station at present is equipped with one bank of three 1,500-kva. transformers supplying three circuits at 4,000 volts, and one bank of three 500-kva. transformers supplying two circuits at 2,300 volts. All equipment is remote-controlled electrically from the switchboard on the second floor. All transformers, regulators and low-tension buses are on the ground floor, while the 33-kv. oil switches and 33-kv. buses and battery room are on the second floor. The architectural simplicity and generally pleasing appearance of both the station and the operator's bungalow adjoining make this an attractive example of substation design.

tion total, submitted to the city early this year, was \$39,515,446.

One important difference in pricing between the two groups of engineers pertains to the Shoshone water rights, which cost the Public Service Company \$670,000, which were appraised by the federal court at \$500,000 in the Colorado Power Company rate case, and which were valued at only \$232,745 by the city's engineers.

On the suggestion of Ray Palmer, engineer in charge employed by the city, conferences will be held between the engineers representing the city and the company, and interested city officials and representatives of civic organizations, after which the chairman of the utilities commission of the council will call further public meetings.

### Lighting Committee to Conduct School in San Diego

During the week of Jan. 9, 1927, the lighting committee of the Pacific Coast Electrical Association, under the leadership of Clark Baker, Sr., is planning to conduct a lighting school in San Diego, Calif. Classes will be held in the basement of the Electric Building. There will be five classes, as follows: Monday evening at 7:30; Tuesday afternoon at 2 o'clock; Wednesday evening at 7:30; Thursday at 2 o'clock in the afternoon and 7:30 in the evening.

Tuition will be \$10 for the course and this sum will be refunded if the individual attends all of the lessons, \$2 being subtracted for each lesson that is missed. The class will be limited to forty persons.

### Court Renders Decision in Suit Involving Heater Patent

Patent rights under patent No. 1,518,067, dated Dec. 2, 1924, issued to W. Wesley Hicks, manufacturer of Wesix electric heaters, have been upheld in a decision by Judge Frank H. Kerrigan of the United States District Court in an infringement suit against the Majestic Electric Appliance Company, Inc. In sustaining the claims the court enjoined the Majestic company from manufacturing certain types of heaters and ordered an accounting

of profits said to have resulted from the infringement. In his opinion Judge Kerrigan said:

The evidence shows that a heater made in accordance with the plaintiff's patent is capable of distributing heat by both radiation and convection, and is particularly useful in heating large areas. It appears to have met a long existing public need, and to be the first electric appliance of its kind to accomplish satisfactorily the heating of a large enclosure, and the evidence tends to show among other things that the plaintiff's heater was the first of its kind to be both practical and saleable.

Judge Kerrigan also made a general comment on the subject of patents in his decision when he said:

A patent granted by the government of the United States is intended to reward the person who by his talent and industry has produced a meritorious and useful invention, and thereby contributed something beneficial to the public; and courts, in deciding cases in which infringement arises, recognize and follow this policy.

In a letter issued to the trade the Majestic Electric Appliance Company, Inc., states that the decision does not refer to heaters manufactured by the company at the present time and cites a letter to the trade sent out July 22, 1926, in which all previous types manufactured were declared obsolete. In its letter the Majestic company also announces that steps are under way to appeal the case to the United States Circuit Court of Appeals.

**Utah Company Takes Over Moab Plant.**—The Utah Power & Light Company has taken over the property of the Moab Power & Light Company at Moab, Utah. Service to the former consumers of the Moab company began on Sept. 1 under the new management. Approximately 175 customers are served by the Moab plant.



## News Briefs

**Nevada Utility Applies for Transmission Line License.**—The Nevada Valleys Power Company, of Lovelock, Nev., has applied to the Federal Power Commission for a license covering a transmission line from its Lahontan power house. The line will be 29 miles long and will connect with the line of the Truckee River General Electric Company.

**Utah Towns Plan Street Lighting Systems.**—The town of Malad, Idaho, will install a new system of street lighting in the near future, which contemplates providing about three times the street lighting now in effect. The town of Murray, Utah, now is contemplating a program which includes a new "whiteway" lighting system, and will necessitate the installation of about fifty-four standards. If this program is decided upon the work will be done early next year.

**San Joaquin Corporation Authorized to Issue Stock.**—San Joaquin Light & Power Corporation, Fresno, Calif., has been authorized by the California Railroad Commission, in a supplemental order, to issue and sell \$364,000 of 7 per cent prior preferred stock and \$1,636,000 of 6 per cent prior preferred stock in lieu of the \$500,000 of 7 per cent preferred stock and \$1,500,000 of 6 per cent preferred stock previously authorized by the commission.

**Dixie Power Company of Utah Plans Supplementary Generating Plant.**—The Dixie Power Company of St. George, Utah, is contemplating filing an application with the Public Utilities Commission of Utah for permission to build a supplementary hydroelectric generating plant on the Santa Clara River in Washington County, Utah. The proposal is to build an 800-kw. plant below its present No. 2 station at an expenditure of about \$200,000.

**Colorado Utility Opens New Offices.**—The new building of the Southern Colorado Power Company, Pueblo, containing the general offices and appliance sales department, recently was opened formally. J. W. Devereaux, manager of merchandising and electrical appliance sales for the Byllesby Engineering & Management Corporation, directed activities in connection with the event. The electrical appliance display occupies a space 50 x 30 ft. in the front part of the office, and the main floor of the offices occupies 6,120 sq.ft.

**Court Rules Company Liable for Compensation in Case of Electrocuting of Employee Leaving Place of Employment by Unforbidden Short Cut.**—The Supreme Court of Utah recently ruled in the case of the Utah Apex Mining Company vs. Industrial Commission of Utah that the death of an employee of the company caused by contact with an electric cable while the worker was leaving the company's property by a short cut which employees had not been forbidden to use but which was used without their employer's knowledge, occurred "in course of employment" and that compensation was due.

**California Railroad Commission Authorizes Utility to Issue Stock and Bonds.**—The Railroad Commission has authorized Peoples California Hydro-Electric Corporation to issue not exceeding \$35,000 of stock and not exceeding \$65,000 of bonds for the purpose of acquiring the properties of Fort Bragg Electric Company. The purchaser made application to the commission for permission to issue \$75,000 of stock and \$150,000 of bonds for the purpose of acquiring the properties in



Charles Elliott, Alva Gordon, B. J. Miller, Alfred Lane

Here in Utah are our "service men"—the fellows who are on call all day long to see that electric service to your home, place of business or city street lights is not interrupted for long. They do small jobs of maintenance, but are also trained to repair, correct and disconnect and connect all power or trouble calls.

Charles Elliott is the day service man in Aberdeen and Comstock. He is a journeyman foreman and has been with the Company since 1920.

Alfred Lane is the day service man for Hopland. His duties are varied and include all sorts of odd jobs besides service calls and electric subjects and disconnections.

Right inside all over his system is attended to by Alva Gordon. He is on duty from 8 P. M. to 8 A. M. Besides responding to service calls and performing other duties, he reports all street lights not burning that he can find. Mr. Gordon is a journeyman foreman.

"Chief," Miller has been with the Company four years. His job is to remove the wires, poles and lines after the street lights all over the system.

There are 100 independent street lights of various sizes and 113 Boulevard lighting fixtures in the street lights served by us. To get a street light in the location specified by the city authorities frequently requires an extra hour or so of our staff of men. About 2100. For the street lighting service, which we furnish, including lamp service, the cost to the community averages less than seven cents per lamp per night. This is a nominal cost when compared with the inconvenience and danger of unground or poorly lighted streets.

Our modern plant and distribution system enables us to supply electrical service equal to the best anywhere. Since there is no longer any reason for inferior service, we expect our customers to be absolutely satisfied with the service we provide. If such is not the case, a favor will be conferred upon us by advising us of the trouble.

The men whose pictures are shown in this article were taken when a man was out of service, or having trouble, three days, so to ensure service and promptness. It is one of our policies to have the fault in case of other men.

These men typify the spirit of service—want to know in which way plant and organization are dedicated.

"Common sense is the knack of seeing things as they are, and doing things as they ought to be done."

GRAYS HARBOR RAILWAY & LIGHT CO.

One of the "Get Acquainted Series" of advertisements published in local newspapers by the Grays Harbor Railway & Light Company, Aberdeen, Wash. In friendly, chatty style these advertisements introduce different employees of the company and explain the work they do, thus making an opportunity to emphasize, in the wording of this advertisement, the spirit of service—that ideal to which the plant and organization are dedicated.

question, but the commission authorized the issuance of \$100,000 of securities only, and required applicant to file stipulation that it will not issue or record on its books any form of indebtedness to represent the difference between the amount of \$100,000 authorized and the \$225,000 applied for. The commission also has initiated a proceeding on its own motion for the investigation of the rates, rules and regulations of Fort Bragg Electric Company.

**B. C. Mining Company Installs Two Steam-Driven Turbo-Generators.**—The Consolidated Mining & Smelting Company of Canada is installing two steam-driven turbo-generators, each of 1,500-kw. capacity, at its Sullivan mine at Kimberley, B. C. The generators are for use during water shortage when the East Kootenay Power Company is unable to supply all the current required by the smelting company. The Consolidated company is about to put into operation the new 1,000-ton unit to its concentrator, which will bring its daily capacity up to 4,000 tons. It is this new addition that has necessitated the installation of the generators.

**Electric Meter Shop Team Wins First Aid Contest.**—During Safety Week, observed recently in San Francisco, a special resuscitation test was held in the Civic Auditorium. The contest was won by the Electric Meter Shop team from the Pacific Gas and Electric Company with a perfect score, 100 per cent, and was presented with the Dr. James Eaves trophy, a bronze cup. The team was composed of Carl J. Macintire, captain, Donald Westdyke, Raymond Miller, Elliott Sidey, Frank Griffin, Donald Cameron and Stephen Grosscup.

**Utah Municipalities Protest Rates.**—A resolution authorized by the representatives of 26 cities in Utah at a recent meeting of the Municipal League, asks the public utilities commission of the state to investigate the rates charged by the Utah Power & Light Company. The resolution cites rates in Los Angeles, Pasadena, Seattle and Tacoma, municipal ownership strongholds, and demands that the Utah company be made to show cause for its present rates. Mayor C. C. Neslen of Salt Lake appointed the committee to draw up the resolution.

## A. I. E. E. News

Institute meetings as now scheduled, according to the national secretary, are as follows: Feb. 7-10, 1927, New York, winter convention. March 17-18, 1927, Kansas City, regional meeting. April 14-16, 1927, Bethlehem, Pa., regional meeting. May 25-27, 1927, Pittsfield, regional meeting. June 20-24, 1927, Detroit, summer convention.

**Los Angeles Section** is to be the guest of the student branches of the University of Southern California and the California Institute of Technology at a joint meeting Dec. 7. The meeting is to be held on the "Cal. Tech." campus in Pasadena where those attending will be served a dinner and subsequently entertained with numerous laboratory demonstrations.

**San Francisco Section** will meet Nov. 19 to avoid competing with Thanksgiving festivities. R. B. Kellogg, Pacific Gas and Electric Company, will discuss Automatic Substations. The meeting will be held in the Engineers Club rooms at 57 Post Street and will be preceded by dinner at Marquard's Cafe, Geary and Mason Streets.

**Seattle Section** is to be addressed on Dec. 15 by J. D. Ross, superintendent of the Seattle municipal light and power department, on the subject. The Diablo Development of the Skagit River Project.

**Vancouver Section** will hold its regular meeting Tuesday, Dec. 7. Douglas Robertson will speak on the subject of Electric Boilers.

**Vancouver Section official personnel for 1926-27.**—Chairman, R. L. Hall, secretary, C. W. Colvin; executive committee—R. L. Hall, A. Vilstrup, C. N. Beebe, A. C. R. Yuill, C. W. Colvin; meetings and papers committee—A. Vilstrup, F. W. MacNeil, J. Teasdale; membership committee—C. N. Beebe, D. M. Johnstone, W. C. Mainwaring, E. G. Craigen, A. M. Clark, A. H. Hopkins.



# Northwest Electric Light & Power Association

## Commercial Section Committee Chairmen Appointed

Announcement of appointments of committee chairmen in the Commercial Section of the Northwest Electric Light and Power Association has been made by the section chairman, George C. Sawyer, sales manager, Pacific Power & Light Company, Portland. These appointments are:

Home lighting—A. C. McMicken, sales manager, Portland Electric Power Company, Portland; industrial lighting—A. C. McMicken; street and highway lighting—F. H. Murphy, illuminating engineer, Portland Electric Power Company, Portland; commercial cooking—J. C. Plankington, sales manager, Northwestern Electric Company, Portland; competitive power—B. P. Bailey, district manager, Pacific Power & Light Company, Yakima, Wash.; refrigeration—Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane; general merchandising—R. M. Bleak, manager merchandise and lighting sales, Utah Power & Light Company, Salt Lake City; domestic electric range—J. F. Orr, sales manager, Idaho Power Company, Boise; industrial heating—R. W. Clark, sales manager central district, Puget Sound Power & Light Company, Seattle; transportation—L. R. Grant, assistant sales manager central district, Puget Sound Power & Light Company, Seattle; and customer relations—E. L. Crockett, assistant to vice-president, Eastern Oregon Light & Power Company, Baker, Ore.

Some changes in committee designations are noted from those of last year. These have been made to conform to the new classification of Commercial Section committees by the N.E.L.A.

Definite work of the section for the year has not been outlined as yet in the Northwest. The chairman proposes to defer his executive committee meeting until after the Commercial National Section meeting in Chicago in November, at which the Northwest will be represented, so that the work in this geographic division may be co-ordinated with the national program.

## Women's Committee Holds First Meeting of the Year

One hundred per cent attendance and a proportionate enthusiasm marked the first meeting of the year of the Women's Committee of the Northwest Electric Light and Power Association, called to order by Marguerite Butler, Portland Electric Power Company, Portland, chairman, at the Benson Hotel, Portland, Oct. 18. Fourteen chairmen of local women's committees were present, representing every organized women's committee in the territory.

It was decided to study certain subjects in committees during the year, and committees were appointed for this purpose with the following chairmen: personnel problems—Mary K. Walsh, The Washington Water Power Com-

pany, Spokane; programs for smaller companies—Stella Dorgan, Mountain States Power Company, Albany, Ore.; co-operation with women's clubs—Ellen McCurdy, Pacific Power & Light Company, Walla Walla, Wash. These committees were instructed to report at the second and last meeting of the general committee, which is to be held some time in the spring of next year.

Miss Butler, who had attended the meeting of the National Women's Committee in Chicago, Oct. 4-5, reported on the program adopted by that committee. This program is based on the idea that utility women should understand the operation of electrical appliances, and lists a number of subjects suitable for the program of company meetings. Lectures covering these subjects are to be sent out. A number of films produced by the General Electric Company also are to be made available for such meetings.

Reports covering work done in the companies since last meeting were given by a number of the chairmen. Edna Comstock, delegate from the Oregon Public Utility Information Bureau, Portland, distributed a quantity of literature prepared by that bureau to combat the Oregon water and power development measure of the Housewives' Council, to be voted on at the November election, and made available to the committee all the data in her office to assist members in preparing essays on a variety of utility subjects. A short talk on public relations was given by W. P. Strandborg, publicity agent, Portland Electric Power Company, Portland.

## P.C.E.A. News

### "Behind the Scenes" Program for Advertising Section

"Behind the Scenes" will be the keynote of the meeting to be held by the Advertising-Publicity Section at the Hotel Biltmore in Los Angeles Dec. 3. Details of the program follow:

10 a.m. to 12—Business session. Section Chairman R. E. Smith, presiding.

12 m: Luncheon at the Biltmore.

2 to 5: "Behind the Scenes" program, D. L. Scott, chairman.

Discussion: "Behind the Scenes in a Public Utility Advertising Department."

J. Charles Jordan, advertising and publicity director, Pacific Gas and Electric Company (30 minutes). Mr. Jordan will illustrate his address with slides.

Richard E. Smith, advertising manager, Southern California Edison Company (10 minutes).

J. F. Pollard, vice-president and general manager, Coast Valleys Gas & Electric Company (15 minutes).

General discussion (25 minutes).

Discussion: "Behind the Scenes with an Engraver."

Ralph L. Garnier, proprietor, Garnier Engraving Company (30 minutes).

General discussion (25 minutes).

Discussion: "Behind the Scenes with the Typographer."

Henry Mayers, president, the Mayers Company (20 minutes).

General discussion (25 minutes).

## Hydro Developments Discussed at Chicago Meeting

By J. M. GAYLORD, chairman P.C.E.A. Hydraulic Power Committee

Fishways, water-wheel testing, forecasting water supply, guide bearings, packing for hydraulic machines, governor problems and draft tubes were the subjects of progress reports by respective subcommittees at the meetings of the hydraulic power committee, N.E.L.A., at Chicago Oct. 13-14. Completed reports were presented covering mechanical reliability of hydroelectric units for the year 1925 and covering hydro plant layout. Dr. N. W. Cummings gave a final report of his evaporation research work at California Institute of Technology.

Discussion confirmed the logic of assigning to the geographic divisions the study of subjects that can be handled by the division better than by the national committee. For example, problems relative to high-head development are of general interest, but can be studied to best advantage by the Pacific Coast. Penstock valve study has been adopted as a national study.

## N.E.L.A. Recognizes P.C.E.A. Customer Relations Work

Recognition has been accorded the work of the 1924-25 customer relations committee of the P.C.E.A. Commercial Section by the Commercial National Section in that the Pacific Coast association's committee report has been copied in full in Service Suggestions, the publication of the N.E.L.A. section's customer relations committee.

The first part of this report, "Better Customer Relations Through Our Employees," which was published in the June 1, 1925, issue of the Journal of Electricity on pp. 390-393, appeared in the July-August number of Service Suggestions. The second part, "The Proper Treatment of Our Customers," pp. 393-397 of the above issue of the Journal, comprises the entire contents of the September-October number of the N.E.L.A. publication.

## Chicago Meeting Co-ordinates Meter Committee

By A. J. HALL, chairman, P.C.E.A. Meter Committee

Thorough co-operation with geographic divisions, success and extension of educational courses for metermen, and a study of meter test periods were the outstanding features of the national meter committee meeting held in Chicago Oct. 13-14. Full co-operation is resulting in mutual advantage to the divisions and to the national committee. Meter test periods were a subject of great interest. Many states now have official regulations governing the test periods and others are considering such action. Educational courses for metermen now are available each year in all but eight states, and the interest in them is on the increase.

Attention also was given to the increasing responsibilities of the test departments of electric service companies. Watthour meters now are but one item of the work. Standardization is progressing.



## News of the Electragists



### Will Hear Reports on Article Five and Wiring Conference

To hear a report on the work of the Article Five committee on the revision of the National Electrical Code from Ben C. Hill, supervising inspector of the city of Oakland, and president of the California Association of Electrical Inspectors, who was a delegate to the recent meeting held in Atlantic City, the Electragists of the San Francisco Bay region have called a meeting to be held at the Palace Hotel, Friday, Nov. 19. At the same time C. T. Hutchinson, president, McGraw-Hill Company of California, who attended the meeting of the Electrical Industry Conference on Wiring, held in New York City, Oct. 15, will relate what took place in that important conference.

An invitation to attend the dinner meeting has been sent out by C. L. Chamblin, president of the California Electragists, to those interested in these reports.

The Article Five committee met in Atlantic City (see Journal of Electricity, Nov. 1, 1926, p. 354) to consider revision of article five of the National Electrical Code, and to establish a more detailed and specific code on wiring methods. Mr. Hill was the California representative to the meeting, representing the California Association of Electrical Inspectors, the California Electragists, and the California Electrical Bureau. Mr. Hill is to relate the efforts made by the committee to secure a more adequate article five for the revised code, discussing various factors leading to the decisions reached.

The Electrical Industry Conference on Wiring was called to consider the economic factors underlying the present controversy between the National Electric Light Association and the Association of Electragists, International, on the subject of the Electragists' all-metal wiring standard and its effects on the expansion of house-wiring business.

Statements were presented by the chairman of the delegation representing the National Electric Light Association, the National Electrical Manufacturers' Association, the Electrical Supply Jobbers' Association, and the Association of Electragists, International. The Electragists were said to have presented a strong case, calling for further discussion of the points brought out in the conference. An executive committee was appointed comprising the four delegation chairmen and Earl E. Whitehorne, commercial editor of Electrical World, chairman of the conference, to collect and compile information and facts bearing on the issues involved, namely, whether the all-metal wiring standard is more expensive than non-metallic wiring methods, and whether the all-metal standard, be it more or less expensive, restricts the market for wiring. A further meeting of this committee has made its report.

Mr. Hutchinson, in New York at the

time, attended the conference on behalf of the Journal of Electricity. He will tell the Electragists meeting, Nov. 19, further details of the industry wiring conference.

W. A. Castleton, formerly Thompson & Castleton, electrical dealers at 1414 Alaska Building, Seattle, has recently awarded contract for a \$30,000 business block on First Avenue near Lander Street. The building will be leased to the Cunningham Electric Company, now located at 912 First Avenue South. The structure will be 60 x 150 ft., one-story, of concrete.



R. H. Manahan (left) chief, Department of Electricity, Los Angeles, and Frank A. Short, Safety Electric Products Corporation, Los Angeles.

### Aberdeen Contracting Firm Under Reorganization Renamed

Formerly known as the Phillips & Thomas Electric Company, S. P. Phillips and F. P. Thomas recently announced that the company had been reorganized under the name of the Electric Equipment & Engineering Company, located as formerly at 206 East Wishkah Street, Aberdeen, Wash.

In the reorganization P. A. Bertrand was named president, S. P. Phillips vice-president, and F. P. Thomas secretary. D. C. Bertrand, formerly with the Great Western Power Company of San Francisco, resigned from that company recently to become affiliated with the new company in Aberdeen.

The new company engages in wiring, specifications for industrial installations and merchandising of high-grade fixtures and appliances, and electric ranges and refrigerators actively are merchandised.

### Denver Contractors Learn of Red Seal Plan Operation

Thirty-eight contractors and journeymen of Denver and suburban area attended an evening meeting arranged by the Electrical League of Colorado, Oct. 21. The purpose of the meeting was to explain the Red Seal Plan in detail and to encourage electrical contractors to tie in with the League's advertising and promotional activity. League and non-league members alike were in attendance.

In order that the contractors might be better able to plan Red Seal layouts, a blackboard demonstration was given by the League's executive manager, George Bakewell, Jr. This illustrated the method of increasing the electrical installation in a two-story residence so as to conform to the minimum standards adopted for the community.

According to E. A. Scott, chairman of the League's Red Seal Committee, the meeting was a decided success, and a great interest on the contractors' part is evidenced. Similar educational meetings are to be arranged in the near future.

H. C. Reid & Company, Electragists of San Francisco, recently announced they had been given exclusive rights to install Central fire-protection devices in northern California. J. B. Cone has been announced as in charge of the work.

J. A. McWilliams, Red Seal representative for the California Electrical Bureau, was the feature speaker at the Oct. 14 meeting of the Marin County Electrical Development League, according to announcement made by H. V. Patton, secretary of the league.

Keith's Electric, Ellensburg, Wash., wiring contractors and dealers in electrical appliances and fixtures, has been purchased by the Puget Sound Power & Light Company, according to V. P. McNamara, resident manager. Mr. Keith will remain with the company as sales manager.

The Electrical Contractors Association of Seattle recently entertained J. A. Fowler, president of the Electragists International, at a banquet at the Olympic Hotel, presided over by S. G. Hepler, president of the Seattle association. During his day's stay in Seattle, Mr. Fowler was entertained with a trip to Snoqualmie Falls.

The city of Walla Walla, Wash., will shortly have in operation a new electrical code, worked out by City Electrician John Casey, with the advice of the electrical bureau of the Board of Fire Underwriters. Under the ordinance all electrical supplies sold in the city must have the approval of the city electrician and meet with the requirements of the city code.

C. A. Utley, formerly of the Pelton Water Wheel Company, has taken over the capital stock of James Woods and F.E. Kayo and now is president and general manager of the California Mechanical and Electrical Engineering Company, located at 1110 J Street, Sacramento. R. J. Finchley, formerly president and manager, will become superintendent of outside construction under the new set-up.

## Meetings

### Joint Pole Committee Celebrates Twentieth Anniversary

At a luncheon recently held in honor of the twentieth anniversary of the existence of the Joint Pole Committee of Los Angeles, J. E. Macdonald, who has been secretary for the entire life of the committee, was presented by his fellow members with a Hamilton gold watch. E. R. Morehouse, superintendent of the Los Angeles Gas & Electric Corporation and a member of the original committee, made the presentation speech.

Speeches were made by R. E. Cunningham, formerly of the Southern California Edison Company, and Claude Campbell of the Los Angeles Railway Company, both of whom were members of the original committee. About forty were present at the luncheon.

The Los Angeles Joint Pole Committee represents seventeen different public utilities doing business in southern California, and during the twenty years which it has been operating has effected great economies in pole costs for all its members.

### Prominent Official of Graybar Company Luncheon Guest

Thirty-five Graybar Electric Company officials, department heads, and salesmen attended a luncheon in the Tapestry Room of the Palace Hotel in honor of Frank A. Ketcham, executive vice-president, who recently paid a visit to the Pacific Coast.

Mr. Ketcham spoke of the progress which has been made by the Graybar Electric Company, formerly the supply department of the Western Electric Company. He dwelt particularly on the important part the company has played in the development of such outstanding achievements as the Vitaphone, which synchronizes speech with motion pictures, and the electrical recording of phonograph records.

He also spoke enthusiastically of the new Graybar Building, the largest office building in New York, which now is being constructed to house the executive offices of the company.

### Electragist President Talks to Rocky Mountain League

At a meeting held recently in Salt Lake City by the Rocky Mountain Electrical Co-operative League Joseph A. Fowler, president of the Association of Electragists, International, was the guest of honor and principal speaker.

In his talk Mr. Fowler stressed the importance of the electrical contractor-dealer as a factor in the welfare of the electrical industry, and urged the members of this branch of the industry to play their full part in helping to promote its best interests.

Ed. H. Eardley, of the Eardley Electric Company, former district representative of the Association of Electragists, International, presided at the meeting, which was attended by a large number of people in the electrical industry.

### Heating Devices Section of the N.E.M.A. Elects Officers

At the annual meeting of the Heating Devices Section of the National Electrical Manufacturers' Association held at the Mansfield Works of the Westinghouse Electric & Manufacturing Company, H. J. Mauger, of the Edison Electric Appliance Company, Chicago, was elected chairman; A. T. Fish of the Lindemann & Hoverson Company, Milwaukee, secretary; and J. S. Kennedy, of Landers, Frary & Clark Company, New Britain, Conn., treasurer.

The thirteen members of the Heating Devices Section in attendance at the meeting were entertained by the Westinghouse company with a luncheon

### COMING EVENTS

#### Pacific Coast Electrical Association—

Meeting of Executive Committee  
Office of Secretary, 447 Sutter Street,  
San Francisco  
Nov. 19, 1926, at 2 p.m.

Purchasing and Stores Section Meeting  
San Francisco, Dec. 2-3, 1926

Advertising-Publicity Section—  
Quarterly Meeting  
Edison Building, Los Angeles  
Dec. 3, 1926

#### Northwest Association of Electrical Inspectors—

Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 17-18, 1927

#### Pacific Division, Electrical Supply Jobbers' Association—

Quarterly Meeting—Hotel Del Monte,  
Del Monte, Calif.  
Jan. 27-29, 1927

and dinner at the Westbrook Country Club, and were conducted on a tour of inspection through the local Westinghouse factory, where household heating devices are manufactured.

**Chico League Discusses Electric Cooking.**—H. A. Cram, factory representative of the Universal Electric Appliance Company, was the speaker at the monthly meeting of the Northern Counties Electrical Development League, held in Chico, Calif., recently. Electric cooking was the subject of discussion at the meeting, several other speakers from local circles taking part.

**Division Manager Host at Staff Dinner.**—The sales staff of the Sacramento division of the Great Western Power Company of California a short time ago was tendered a dinner at the Del Paso Country Club by H. E. Brillhart, division manager. The program was in charge of Monte Pfyl, Miss Martha Robinson took care of the menu, and credit for the decorations was due Mrs. Boatwright. F. H. Woodward, general sales manager of the company, with headquarters in San Francisco, and Mrs. Woodward were special guests at the dinner.

**Colorado Electrical League Holds Annual Roundup of Members.**—Electrical men and their families, more than 300 in number, were in attendance at the annual fall "Roundup" of League members arranged by the Electrical League of Colorado, Denver. In order to create an atmosphere of the days of '49, those present were permitted to "gamble" with scrip for hams, candy and other articles provided for the occasion.

## Book Reviews

### PRINCIPLES UNDERLYING THE DESIGN OF ELECTRICAL MACHINERY

By W. I. Slichter, Professor of Electrical Engineering, Columbia University; Consulting Engineer, New York City. 312 pages. 152 illustrations. 55 tables. 6x9 in. Cloth-bound. 1926. Published by John Wiley & Sons, Inc., New York City. Price \$3.75.

The author is a designing engineer of broad experience. The text of this book has been developed from a course of lectures given by the author at Columbia University and is based upon experiences of the author in his practicing career.

The subject matter is handled in a logical sequence beginning with a brief discussion of general principles and fundamental relations. The treatment then progresses consecutively through studies of the d.c. generator, the salient-pole a.c. generator, the turbine-driven a.c. generator, the transformer, and the induction motor. Each of these subjects is dealt with in a separate chapter beginning with a discussion of the fundamental principles involved in the construction and operation of the particular equipment described in that chapter and then progressing on through the detailed design features and problems.

Formulae have been derived from fundamental principles and are accompanied by explanations of each formula and the reasons for the various standards of practice as outlined in the text. The objective of the author according to his own statement is to give a practical method of design, together with explanations of the physical meaning of the arbitrary constants used by the professional designing engineer.

The book is suitable for use as a text in technical schools and also should serve at least the younger generation of graduate engineers as a reference explaining the "why" of certain conventional design practices.

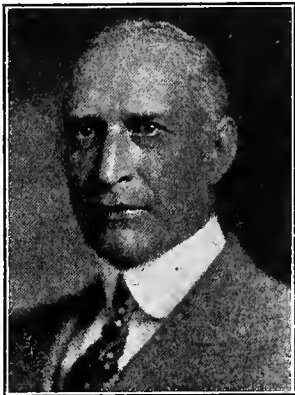
G.R.H.

**Byllesby Company Issues Booklet on its Properties.**—H. M. Byllesby & Company has just published a comprehensive 32-page illustrated book describing Standard Gas & Electric Company and its operated and affiliated public utilities. Forty-five photographs of the principal steam and hydroelectric stations, gas manufacturing plants, substations, etc., are reproduced. A large four-color map, showing the extent and diversification of the company's investments is included.

**High Steam Pressures and Temperatures.**—Serial report of the prime movers committee, N.E.L.A., giving data gathered from plants employing a high-pressure or high-temperature steam cycle. Data are tabulated in a form permitting analysis of heat consumption of these plants. Well illustrated. Published July, 1926. Price to members 10 cents.

## Personals

William S. Berry, manager, Graybar Electric Company, San Francisco, has received a certificate of honorable mention under the James H. McGraw Award for 1926 "in recognition of his splendid record of constructive contribution to the jobbing branch of the electrical industry." After setting forth that Mr. Berry has been a consistent and tireless worker for the encouragement of high ideals of service



WILLIAM S BERRY

among the electrical jobbing fraternity of the Pacific Coast for twenty years or more, the citation continues: "He has been an outstanding leader in co-operative work. He has served the Pacific Coast Jobbers Association as chairman and in every capacity on committees. He was a large factor in developing the California Electrical Co-operative Campaign and the California Electrical Bureau. He was a member of the advisory committee in the promotion of the convenience outlet, the electrical home, and the Red Seal campaigns. He was one of the early presidents of the San Francisco Electrical Development League in the days when the league was languishing for lack of interest and he contributed largely to bringing about its present position of importance. He has taken a broad constructive interest in the welfare of the electrical contractor and has worked indefatigably to promote contractors' organizations and to awaken them to a full responsibility in their relations with the other branches of the industry. In a word, the name of William S. Berry has become inseparably identified with the growth of the electrical industry in all its phases throughout the entire Pacific Coast." Mr. Berry, who began his electrical career with the Thomson-Houston Company and later spent some time with the Consolidated Traction Company of Pittsburgh, has been associated with the Western Electric Company and its connections since 1904.

J. K. Knighton, zone sales supervisor for the Frigidaire Corporation in the Seattle district, has gone to Dayton, Ohio, to attend a general conference on sales, advertising and service policies for 1927.

James L. Boone, for the past year assistant attorney with the Utah Power & Light Company, Salt Lake City, has resigned to become attorney for the Idaho Power Company at Boise.

Ralph Clapp, who spent the past year in the U. S. Forest Reserve, has returned to the electrical industry, having re-established the firm of Clapp & Lamoree, manufacturers' agents.

H. H. Daly, sales manager, Mejaestic Electric Appliance Company, Inc., San Francisco, returned not long ago from a month's business trip through the Middle West and South.

A. McNaught, who formerly traveled in Nevada and the northern part of California for the Electric Appliance Company of San Francisco, has joined the staff of Alexander & Lavenson of that city.

Ray W. Turnbull, Pacific Coast district manager, Edison Electric Appliance Company, recently returned to San Francisco from Honolulu where he discussed business conditions with the Hawaiian Electric Company.

C. L. Huyck, of the Graybar Electric Company, San Francisco, recently paid a short visit to Los Angeles.

Nathan A. Bowers, Pacific Coast editor of Engineering News-Record, has been elected president of the San Francisco Engineering Club, and E. M. Breed, of the Pelton Water Wheel Company, vice-president.

B. A. Seymour, chief clerk of the Monrovia district office of the Southern California Edison Company, has been transferred to the Montebello district as chief clerk. B. L. Nunnally, chief bookkeeper in the Whittier district, has been promoted to take the chief clerk's position in Monrovia.

F. E. Davis, for many years connected with Fobes Supply Company, Portland, has been named manager of the Oregon branch of that company to succeed C. M. Will, who died June 13, 1926.

R. G. Gentry, manager public relations department, Public Service Company of Colorado, was the principal speaker at a recent meeting of the Gyro Club in Denver. Mr. Gentry's address included many statistics regarding the operations of his company throughout the state.

A. E. Hitchner, district manager for the Westinghouse Electric & Manufacturing Company in Los Angeles, has returned from a month's trip to the East. He attended the district managers' meeting at St. Louis and later spent some time at the Pittsburgh plant.

J. J. Hannemann, manufacturers' representative, National Lamp Works of the General Electric Company, has been transferred from Kansas City to the Mountain states territory with headquarters in Denver.

A. E. Bacon, manufacturers' representative in Denver, recently made a trip to New York and secured the account of Edwards & Company, Inc., for the Mountain states territory.

C. B. Angenette, president, the Domestic Appliance Company, Oakland, Calif., lately has been visiting dealers in Meadows washers in southern California.

D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake City, accompanied by W. R. Putnam, vice-president and general manager, Idaho Power Company, Boise, recently made a trip to New York City.

H. H. Higbie, professor of electrical engineering at the University of Michigan, was elected president of the Illuminating Engineering Society at its recent convention in Spring Lake, N. J.

R. L. Hearn, chief engineer for H. G. Acres & Company, Niagara Falls, Ontario, Can., not long ago visited The Washington Water Power Company, Spokane, where he was formerly employed as assistant chief engineer. He inspected the new Chelan development in company with V. H. Greisser, chief engineer of the company.

F. B. Odum, formerly of the legal department of the Utah Power & Light Company, Salt Lake City, and now vice-president of the Electric Bond & Share Company, visited that city not long ago.

William Watson, works manager of the Allis-Chalmers Company of Milwaukee, was a recent Seattle visitor. Mr. Watson has been making a survey of the company's holdings on the Pacific Coast.

S. P. Russell, for a number of years part owner and vice-president of the H. B. Squires Company of San Francisco, Los Angeles, Portland and Seattle, has acquired the holdings of H. B. Squires and is now president of the company, which will retain its present name. Mr. Russell, who maintains his headquarters in San Francisco, has been connected with the electrical industry during practically all of his business career. After spending a short time in the drafting room of Charles C. Moore & Company, Engineers, he resigned in 1903 to enter the employ of the Holland Supply Company, which handled steam and electric railway supplies, and a short while later took over the business. He sold it in 1905 to Johns-Manville, Inc., and accepted a position in charge of that company's electrical department for the Pacific Coast. A year later he was transferred to the New York office and in 1907 opened the New Or-



S. P. RUSSELL

leans office of Johns-Manville, Inc. The following year he returned to San Francisco, remaining with that company until 1918 when he joined the H. B. Squires Company. Mr. Russell has devoted much of his time to the study of lighting, and last year served as the chairman of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society. A particularly interesting feature of the change in ownership of the H. B. Squires Company is that a number of the employees who have been connected with the concern for some time have been allowed to acquire some of the stock.



**R. H. Ballard**, executive vice-president and general manager, Southern California Edison Company, Los Angeles, addressed the Associated Chambers of Commerce of the San Gabriel Valley at a recent meeting.

**Granville H. Peets**, since August, 1923, assistant to Capt. Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle, has resigned to rejoin the Seattle branch of the Knox School of Salesmanship to conduct classes in automobile merchandising among dealers and salesmen throughout the country.

**Joseph S. Carroll**, of the department of electrical engineering, Stanford University, has been appointed assistant professor in charge of operation and equipment in the Ryan Laboratory under the supervision of Dr. Harris J. Ryan.

**Lester S. Ready**, chief engineer of the California Railroad Commission for the last three and a half years, has resigned from that post, effective Dec. 15, to accept the presidency of the Key System Transit Company. He will enter into active charge of his new duties shortly after the first of the year, with headquarters in Oakland, Calif. Following his graduation from the University of California with the class of 1912, Mr. Ready spent a year in the distribution department of the Pacific Gas and Electric Company and then in 1913 joined the staff of the California Railroad Commission. Until 1919 he held the position of gas and electrical engineer of that body and then he was made assistant chief



LESTER S. READY

engineer. Four years later he was appointed chief engineer. Mr. Ready's long service with the Railroad Commission and his knowledge of conditions in the East Bay district make him particularly well fitted for his new position. In addition to having been a resident of that section for the past fourteen years, he has been closely connected with its development through the Railroad Commission. For that body he has worked upon all the surveys and investigations made of the public utilities operating in the East Bay district, and for that reason he is well equipped to handle its transportation problems. **A. G. Mott**, for the last three years transportation engineer of the California Railroad Commission, has been chosen to succeed Mr. Ready. **A. V. Guillou**, who has been gas and electrical engineer of the commission for about the same period, has been named assistant chief engineer.

**Lyman D. Morgan**, formerly illuminating engineer with the Perfecite Manufacturing Company, Seattle, has been named northwest manager for the Pittsburgh Reflector Company, Pittsburgh, Pa., with headquarters in Seattle. Mr. Morgan recently spent several months in the East, assisting in the design and installation of the electrical lighting effects on the Tower of Light at the Sesquicentennial Exposition.

**Ben Wright**, of the Southern California Telephone Company, Los Angeles, returned not long ago from an extensive visit in the East. Mr. Wright is president of the southern California chapter of Bell Telephone Pioneers, and while in New York he attended the national assembly of that organization.

**J. H. Siegfried**, superintendent of power, Pacific Power & Light Company, Portland, was among those who attended the recent A.I.E.E. convention in Salt Lake City.

**J. A. Hale**, chief engineer, Utah Power & Light Company, Salt Lake City, recently returned from a short sojourn in New York.

**F. L. Maytag**, chairman of the board of directors of the Maytag Company, Newton, Iowa, recently was presented with what is claimed as the world's largest and most valuable medallion. The medallion, presented at the second annual dealers' convention banquet in Des Moines, was given to Mr. Maytag "in recognition of his outstanding position as manufacturer and merchandiser of electrical home appliances."

**W. F. Raber**, general manager, San Diego Consolidated Gas & Electric Company, recently went to Chicago to attend a meeting of the board of directors of the Standard Gas & Electric Company.

**John W. Carpenter**, formerly connected with the Walker & Pratt Manufacturing Company, has severed his connection with that firm and now is representing the Edison Electric Appliance Company, Los Angeles.

**W. A. Scott**, who has been associated with the Trumbull Electric Company, has left that company and joined the Safety Electric Products Company, Los Angeles.

**Roy Worth** has been made office manager of the Electric Corporation, Los Angeles, in charge of office and warehouse, and **Paul H. Anderson** has been appointed manager of its lamp department, succeeding **H. T. Burkey**.

**T. B. Harned, Jr.**, manager, Ohio Electric Cleaner Company, Oakland, Calif., returned a short while ago from the Northwest where he called upon his firm's representatives there. Mr. Harned spent some time both in Seattle and Portland.

**R. G. Widdows**, sales manager, Electric Controller & Manufacturing Company, Cleveland, recently made a complete tour of the Western territory.

**James M. Barry**, chief of the department of electricity in San Francisco about 1914-1916 and later connected with the Great Western Power Company in that city, has been made vice-president of the Alabama Power Company, Birmingham. Mr. Barry has been associated with the latter company about seven years.

**G. H. P. Dellmann**, lighting sales engineer, San Diego Consolidated Gas & Electric Company, attended the recent meeting of the lighting committee, P.C.E.A., in Los Angeles.

**C. F. Terrell**, who has been superintendent of light and power for the El Paso Electric Company, El Paso, Texas, has been appointed general superintendent of light and power for the Tampa Electric Company, Tampa, Fla. Both companies are Stone & Webster properties. Mr. Terrell is well known in the Northwest. Previous to his removal to El Paso he was superintendent of light and power at Bellingham, Wash., for the northern district of the Puget Sound Power & Light Company. Prior to that time he was connected with that company's organization in Seattle in various capacities, including substation operator, load dispatcher, foreman of substations, construction engineer on station



C. F. TERRELL

construction, and superintendent of substation department. After his graduation from the University of Washington in 1910 Mr. Terrell entered the Stone & Webster organization and has been affiliated with it since that time.

**Frank H. Woodward**, sales manager for the Great Western Power Company, San Francisco, who is vice-president of the San Francisco Lions Club, was among the speakers at the Hallowe'en dinner given by the Santa Rosa Lions Club.

## Obituary

**V. V. Davoud**, for many years an engineer with the Utah Power & Light Company, Salt Lake City, prior to his departure for New York, died in that city recently.

**John Jay Sherwin**, a pioneer in the electric light and power field in Idaho Springs, Colo., died recently in Denver.

**Simon Bamberger**, chairman of the board of the Bamberger Electric Railroad, and for four years governor of Utah, died in Salt Lake City Oct. 6, after an illness of less than twenty-four hours, at the age of 81.

**Claude Robert Alling**, vice-president of Underwriters' Laboratories, died in Evanston, Ill., Oct. 25.

**Thomas I. Stacey**, secretary and treasure of the Electric Appliance Company, Chicago, died in Evanston, Ill., Oct. 24. Mr. Stacey had been connected with the company since its formation thirty-five years ago and was well known in the West.

## TRADE NOTES

Ohio Brass Company has announced the removal of its San Francisco offices to room 532 Matson Building. This arrangement also permits maintenance of better warehouse facilities, the company states.

The Laughlin-Gilmer Company, manufacturers' agent, of Denver, has been named district representative for I. P. Frink, Inc., New York City.

The Electric Corporation, San Francisco, and the Reiman Wholesale Electric Company, Los Angeles, have been admitted to membership in the Pacific Division of the National Electrical Supply Jobbers Association, according to recent announcement of Albert Elliot, secretary.

Pass & Seymour, Inc., Solvay, N. Y., is placing on the market a new bracket type receptacle with the standard convenience outlet. The receptacle is supplied in the pull and keyless types with porcelain shade-holder and with porcelain ring. The manufacturer claims an advantage because the porcelain shade-holder and the porcelain ring are made of the same high-grade porcelain as the body of the receptacle and, therefore, can be relied upon always to maintain the same newness and color as the receptacle.

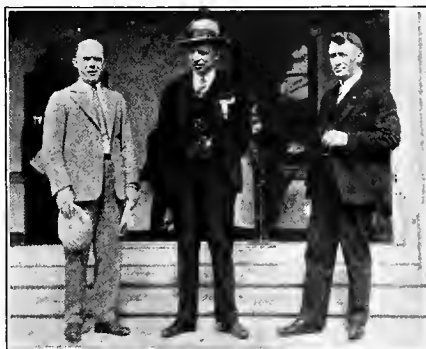
Silent Hoist Winch & Crane Company, Brooklyn, N. Y., has announced the removal of its works and general offices into its new building at 762-772 Henry Street, corner Centre Street. Attention is called to the change in the company's name from "Silent Hoist Company," and the explanation given that the change was made for the sole purpose of more clearly conveying the nature of the company's products.

Federal Steel Products Company, 2-14 Avenue L, Newark, N. J., has ready for distribution its catalog No. 3, which lists most completely all types of externally operated entrance switches, safety switches, steel cabinets, and specialties manufactured by the company. Copies may be secured direct from the home office at Newark or from the Electric Agencies Company, 655 Minna Street, San Francisco, its representatives.

Curtis Lighting, Inc., Chicago, has announced a new design of X-Ray Bank-Ray for bank lighting that consists of small powerful silvered glass X-Ray reflectors concealed in an ornamental housing located at and fastened to the tops of the bank cage cornices and finished in such a way that it appears to be the coping of the grill itself. For direct-indirect lighting, a portion of the light from the X-Ray reflectors is directed down into the cages, but the majority of it is thrown upwards to furnish general illumination for the bank. Where only the bank cage counters are to be illuminated, the top of the Bank-Ray remains housed and all the light is thrown downwards from the lamps in the X-Ray reflectors. For totally indirect lighting, the bottom of the Bank-Ray is closed and all the light is thrown upwards from the X-Ray reflectors in the housing.

Electro-Kold Corporation, Spokane, has had an average increase of 300 per cent a year for the past four years in the volume of its business, according to the report of L. J. Kim-mell, vice-president. The output of Electro-Kold electrical refrigeration machines was about 2,000 in 1926, and that number is expected to be doubled next year, he stated.

Chicago Fuse Manufacturing Company, Chicago, has equipped its Gem XC sectional switch boxes with new adjustable clamps, which not only secure the sheathed and metallic cable or loom, but at the same time close up any knockout hole space not filled up by the incoming cable or loom. The new clamp has an extension so that as the screw is turned down this extension covers the openings, if any, depending upon the size of the cable used.



Hats off to the Electragist! Well, with Claude Herbert, manager of the industrial division of the Westinghouse Electric & Manufacturing Company, and Burrell Manuel, sales manager of the Fobes Supply Company, both of San Francisco, standing with bared heads in the presence of Norman Nelson, proprietor of the Enterprise Electric Works, also of that city, it certainly looks that way, doesn't it? The trinity were snapped on the steps of the Del Monte Hotel at the Electragists' convention.

The Swartzbaugh Manufacturing Company, Toledo, Ohio, recently placed on the market its wall-outlet electric range, which it terms "electrically calipoised" to express "perfect balance" between the cooking capacity of the range and the amount of current consumed. The range does all types of cooking and baking, has a toaster and broiler arrangement, is finished in blue-gray enamel and nickel plate, and weighs 65 lb. List price \$49.50, equipped with racks and roaster pans.

The Wheeler Reflector Company, 275 Congress Street, Boston, has announced that its "Durex" line of industrial lighting equipment has been increased to include five types of canopy construction and three types of reflector. The five canopies are the stamped standard, the cast standard, the stamped outlet box, the cast outlet box, and the pendant. The reflectors are the R.L.M. standard type, the shallow dome type, and the parabolic type. The printed announcement will be sent on request.

Automatic Electric Washer Company, Newton, Iowa, has announced its new, low-priced Model 20 Automatic washer, which can be retailed for less than \$100. This new machine is said to be a machine-made washer, as the entire top, lid, legs, leg braces, and base for copper tub are of pressed steel. The deeply channeled legs are welded electrically to the leg braces in one rigid unit. By the use of these pressed steel parts economies in manufacture are accomplished, it is claimed, and large savings in weight with increased strength are secured. Its design embodies the standard automatic hydro-disc washing principle, and it has 6-sheet capacity self-draining corrugated copper tub, very simple top drive, steel and aluminum reversible swinging wringer with 12-in. full balloon rolls, as well as other advantages, according to the announcement.

The Robinson Sales Company, Polson Building, Seattle, has been appointed by the Roller-Smith Company, 233 Broadway, New York, its agent for the state of Washington and most of the state of Oregon. The company also has announced the appointment of the Ashida Engineering Company, Ltd., Daini, Osaka, Japan, its agent for Japan, including Korea and Manchuria.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has published a rearranged and revised circular, C-1694-B, which gives a more clear conception of supervisory control and its equipment.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has developed a new portable ship type air heater for use in chart houses, pilot houses, etc. It is rated at 500 watts, single heat, 120 volts, and with the exception of the resistance material all parts of the heater are of non-magnetic materials, brass or copper. The maximum dimensions are 10 in. wide, by 11½ in. high, 6 in. deep and the weight is slightly less than 15 lb. This form of heater has been designed primarily in accordance with latest Navy Department specifications and it has been given approval by the Bureau of Engineering, Navy Department, Washington, D. C., for installations on board ship where this type of heater is used.

Cordit Electrical Manufacturing Corporation, Boston, has issued a new publication, "The Selection and Application of Oil Circuit Breakers." The subject is treated in a comprehensive manner, some of the topics discussed being Methods of Operation, Operating Currents for Electrically Operated Breakers, Recommended Method of Mounting, Selection of Oil Circuit Breakers. The book also contains tables of interrupting capacities for indoor and outdoor service, interrupting capacity and voltage rating data, and numerous diagrams.

Harvey Hubbell, Inc., Bridgeport, Conn., announces a new two-wire "Cord-Grip" locking connector, rated 10 amp, 250 volts. The locking feature of this Hubbell "Cord-Grip" connector provides an extra and very effective safeguard against accidental disconnection, according to announcement. The connectors are built for hard service. The bodies are of strong black composition; the caps are completely armored by a heavy "all-over" shield of steel which is galvanized to prevent corrosion, according to the company.

# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES



## Greeting!

To users of Okonite *every-  
where* — Heartiest good  
wishes for a Happy Holiday  
Season.

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THE OKONITE-CALLENDER CABLE COMPANY, INC.  
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# Like a Comet across a clear sky

*Benjamin Service to the Industry is Blazing a Path into the Consciousness of Thousands of Commercial and Industrial Prospects*

Month after month, in the great national magazines, covering all the basic industries, Benjamin advertising carries the message of better industrial lighting. This is supported by thousands of direct mailing pieces enlarging on these advantages.

For local, intensive work, associating this national advertising with the local lighting specialists, is our complete great campaign on Industrial Lighting.

The Industrial Lighting Committee of the National Electric Light Association is carrying on a follow-up campaign on last year's Industrial Lighting Activity.

## Get our Industrial Lighting Plan Book

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## Benjamin Electric Mfg. Co.

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247 W. 17th St. Chicago

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# Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

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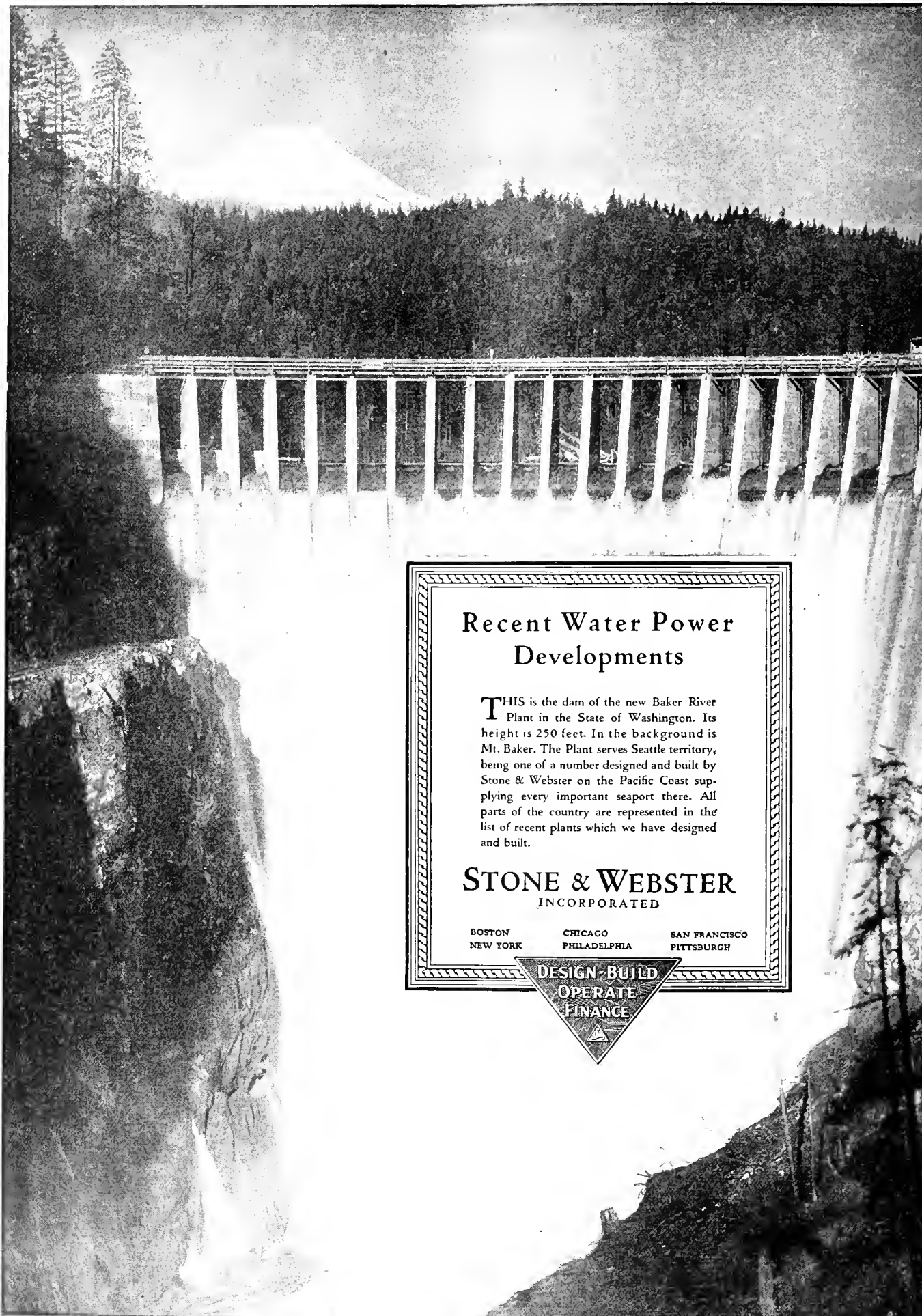
## A Service to Readers and the Daily Press

ONE of the self-constituted tasks of the technical press is to record the achievements of the industry it represents not alone for the benefit of its particular readers but for the layman as well. To this end the group of McGraw-Hill publications of which the Journal of Electricity is a member has been circulating for more than two years a news service to the daily press of the country with gratifying results. Those engineers and technicians who have been prone to feel that their achievements have not been receiving the public recognition that was their due will be surprised to see the accumulation of newspaper clippings received by this company.

The following figures show how the technical press is acting as a liaison agency between the industries it represents and the daily papers:

During six months of this year the space in daily papers in this country devoted to quotations from McGraw-Hill papers totaled 2,009 columns as compared with 1,213 columns during the preceding six months period. Records indicate that quotations from the company's fifteen engineering and industrial magazines are appearing in 546 newspapers in 333 cities.

Facts like these are not known to readers, but they show that the technical papers are more than awake to their responsibilities.



## Recent Water Power Developments

**T**HIS is the dam of the new Baker River Plant in the State of Washington. Its height is 250 feet. In the background is Mt. Baker. The Plant serves Seattle territory, being one of a number designed and built by Stone & Webster on the Pacific Coast supplying every important seaport there. All parts of the country are represented in the list of recent plants which we have designed and built.

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FINANCE

# EDITORIAL

## *Electrical West—Our New Name*

**J**OURNAL OF ELECTRICITY is going to change its name. Beginning January first it will be called *Electrical West*. It will be published monthly. To an even greater degree than in the past, this paper will devote itself to telling the story of electrical development in the West, to interpreting the events of its progress and to giving guidance to its evolution.

**T**HERE is a reason for this change of name. The title "Journal of Electricity" is too general. It does not define either the field or the purpose of this paper. It does not indicate the fact that it is a Western paper, designed for and devoted to the service of the electrical industry in the eleven far Western states. For conceivably a "Journal of Electricity" might be published anywhere, and have a national or even an international scope. The decision to call it *Electrical West* will make obvious the fact that it is a paper dedicated to the service of the electrical industry of the great Western empire.

**M**ANY of the present readers of the Journal of Electricity will recall that this paper was at one time a weekly. It bore the name of Journal of Electricity, Power and Gas. Comparing that publication with the Journal as it is today, it is apparent what a great improvement was effected through the change to semi-monthly publication, making possible a larger, more studied editorial treat-

ment and a news service with better perspective. Further experience of the last seven years has shown that a monthly publication will permit of a still broader editorial activity and will again make possible a better service to the electrical West.

**E**LECTRICAL men in the West are primarily interested in the three major activities of the industry—power generation, merchandising and contracting. *Electrical West*, as a monthly publication, will be better adapted to cover the needs of the West than a semi-monthly. It will have increasing opportunity for serving the readers in the West as their own local paper. It will enjoy broader facilities for upbuilding an intelligent appreciation among its readers of the interdependence of the four branches of the industry here in the West, and to promote the solidarity of the industry on all questions that affect its general welfare.

**T**HE McGraw-Hill Company of California is confident that this announcement will win the instant approval of the electrical men of the West who have so loyally supported the Journal of Electricity. *Electrical West*, the monthly, will carry forward all the fine traditions of the Journal, with greater possibilities for useful service.



President, McGraw-Hill Company of California.

## A New Spirit in

### Commercial Section Activities

UNDOUBTEDLY the men who attended the recent conclave of the Commercial Section of the Pacific Coast Electrical Association—a meeting, by the way, that was the best in the history of the organization—left with a new vision of the responsibilities of the commercial departments of the central stations. If there were men at the meeting suffering from the inferiority complex that has marked most of the commercial departments of California utilities, they could not have helped but react to the inspirational messages of S. Waldo Coleman, president of the association, W. C. McMicken and R. S. Turnbull.

It is certain that the skeletons in the closet, the bugaboos and the fears regarding a frank discussion of central-station merchandising must have been thoroughly dispelled by the statements by those speakers. When one speaker pointed to the average domestic consumption of California of about 300 kw-hr. per annum as against a national average of 365 kw-hr. and a second told that companies in the Northwest are enjoying an average in excess of 600 kw-hr., it is certain that some of the men present, relatively speaking, received a kick in the shins. But the message of greatest importance brought out by the meeting was that commercial men must promote more than the bare normal growth of domestic consumption; that this growth will come only with unanimous sales practices and policies and a persistent and consistent sales effort.

The most apt description of the meeting that can be set down would be to say that it was unfortunate that every chief executive and every commercial executive with all members of his sales staff could not have been present. With the publicity that this meeting will obtain both in the press and by word of mouth it is likely that such a condition will prevail when the Commercial Section announces its next general conclave.

### Concentrate the Attack in Selling

A SECOND record electric range campaign by the Puget Sound Power & Light Company, Seattle, in which 2,769 ranges were sold in sixty days, exceeding the record made this spring by 726 ranges, calls to mind an erudite thought expressed in times past by H. J. Gille, general sales manager. This thought embodies a sales policy, which has been back of that company's efforts in placing ranges among its customers in the past few years, and which, therefore, probably has been responsible in part for its success in this field. Summarized, this thought is that the sales resistances can be analyzed by careful observation and can be broken down by systematic attack.

The company found early in the game that the items of sales resistance to the purchase of ranges by its customers were three: first, that electric energy was expensive; second, that electric cooking was in the experimental stage; third, that the cost of the range and its installation were high. Ac-

cording to Mr. Gille, practically every form of argument advanced by a prospect as to why he should not buy consisted of one or more of these erroneous notions.

What, then, to do? Why, simply concentrate all advertising, propaganda and sales effort on dispelling these notions and let all imaginary resistances take care of themselves.

This is undoubtedly straight sales thinking. That the policy has been used, and successfully, has been borne out by results, and leads to the thought that it could be applied to selling practically any appliance, notably the refrigerator. Of course the crux of its successful application is in the accurate determination of the sales resistance, but careful observation and close study should reveal these. After they are known, shrewd planning of advertising and intensive training of salesmen should conserve a deal of effort now, perhaps, wasted. Many a general has won a battle because his accurate knowledge of the strength and disposition of the enemy's forces has permitted him to direct his attack with a minimum of guesswork and a maximum of strategy.

### The Political Issue

#### Is Only Asleep

IN Oregon the Housewives' Bill, under the more dignified official title of the "Oregon Water and Power Board Development Measure," was gently laid to rest by mourners and rejoicers in almost the exact ratio of one to four. Our statistician, without placing anything end on end, has figured that if the proponents had mustered forty-two more yeses the measure would have been rejected by exactly four out of five voters. This ratio is reminiscent of a now well-known advertisement warning us against the ravages of pyorrhea, but the Housewives' Bill was considerably less subtle than any such insidious disease. It did not intend to creep imperceptibly into the vitals of the body politic there to strike before its dangers might be discovered. Rather did it approach like a hungry animal, whose long, sharp fangs were plainly visible to the most casual observer. Therein lay its weakness. The body politic is sometimes fooled by a wolf in sheep's clothing, but almost never by that wolf stripped of his masquerade.

However, though the measure itself lies deeply buried, its ghost still hovers about. Expression of this condition is heard occasionally in the press—in one breath rejoicing in the defeat of this pernicious measure; in the next wondering what is going to happen to "the people's white coal" and why it is allowed to run to waste; asking why rates are not as cheap in Portland as they are in Tacoma and Los Angeles; dogmatically stating that if they were as cheap industries would flock to Oregon; bewailing the state of the poor farmer, who sometimes must pay an advance earning on the unproductive portion of an extension to serve him; and raising numerous other questions which sound logical and pertinent to many an honest and intelligent voter. Many evidences there are that the essence of the Housewives' Bill will be revived in some form



less objectionable to the electorate but equally threatening to the electrical industry, and that it will be backed by abler proponents. When this is done a fairly plausible case will be made out in its favor and its defeat will be more difficult.

Although facts show and experience further has demonstrated that the arguments in favor of state ownership are fallacious, the electrical industry must not anticipate that the voter will so believe at the next election. The time to start laying the defense for future attacks is now. Let the industry redouble its public relations activities; let it anticipate the weaknesses in its opponents' contentions and begin to controvert them before they are expressed. Above all, let it be understood that the issue is not dead, but that, phoenix-like, it rises and rises and rises, as it has in California.

The first is not that of the public utilities of Oregon alone; it is the fight of the entire electrical industry in the West. Let it be recognized as such with ample preparation to meet it in the knowledge that the industry is right and that right must prevail.

---

#### Hats Off to the Lighting Committee

**A**CCOMPLISHMENT of work set out to be done always merits recognition and commendation. To know what objectives should be sought and intelligently to plan means of attaining those objectives is no less praiseworthy. In both respects the lighting committee of the Commercial Section, Pacific Coast Electrical Association, deserves attention.

That the leadership of this committee successfully has been awarded to its present chairman, Clark Baker, would indicate that under his direction would result the accomplishment desired of this branch of Commercial Section activity.

Three years ago this same lighting committee decided that the writing of papers was all very well in its way but that literary effort alone was not succeeding in producing better lighted homes, schools, offices and factories. The need of the hour seemed to require work. Taking off its Windsor tie and laying down the pen, this committee took off its coat and vest and assailed the problem with vim and vigor.

The first year's activity saw the establishment and successful operation of two lighting schools. The actual accomplishment of work by a committee so affected the Commercial Section that it decided to continue so able a body intact. The second year the lighting committee arranged a condensed and yet complete lecture, illustrated by the use of an ingenious lighting box display, and placed this lecture before the leading business clubs of the state of California, reaching over 3,000 business men.

This year the lighting committee already has accomplished a major part of its work, while many other committees have not yet begun to organize. The first section of its work, that of carrying a review of the committee's work to the jobbing organizations and enlisting their support in follow-up

sales effort, has been accomplished. The second major task, that of presenting to the State Highway Commission a complete analysis and survey of the possibilities for lighting the highways of the state at a very modest cost, is under way. The third activity, the conduct of a lighting school and lighting week in San Diego in January, wherein the results from the school will be closely studied, is well organized and ready to start.

It would seem but natural that the illumination men, the pioneers of the electrical industry in truth, should continue to lead the procession for greater electrification. Although electric light has come into general acceptance per se, the lighting men do not intend to let the matter stand there. For many years the mere fact that electric light was superior light seemed to be enough. Now the lighting committee is to lead us to the realization that not by light alone may we expect to see, but rather by light controlled, adapted, and directed so that as a crude force it will not blind its beneficiaries through the very potency of its energy misused.

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#### Accidents vs. Production

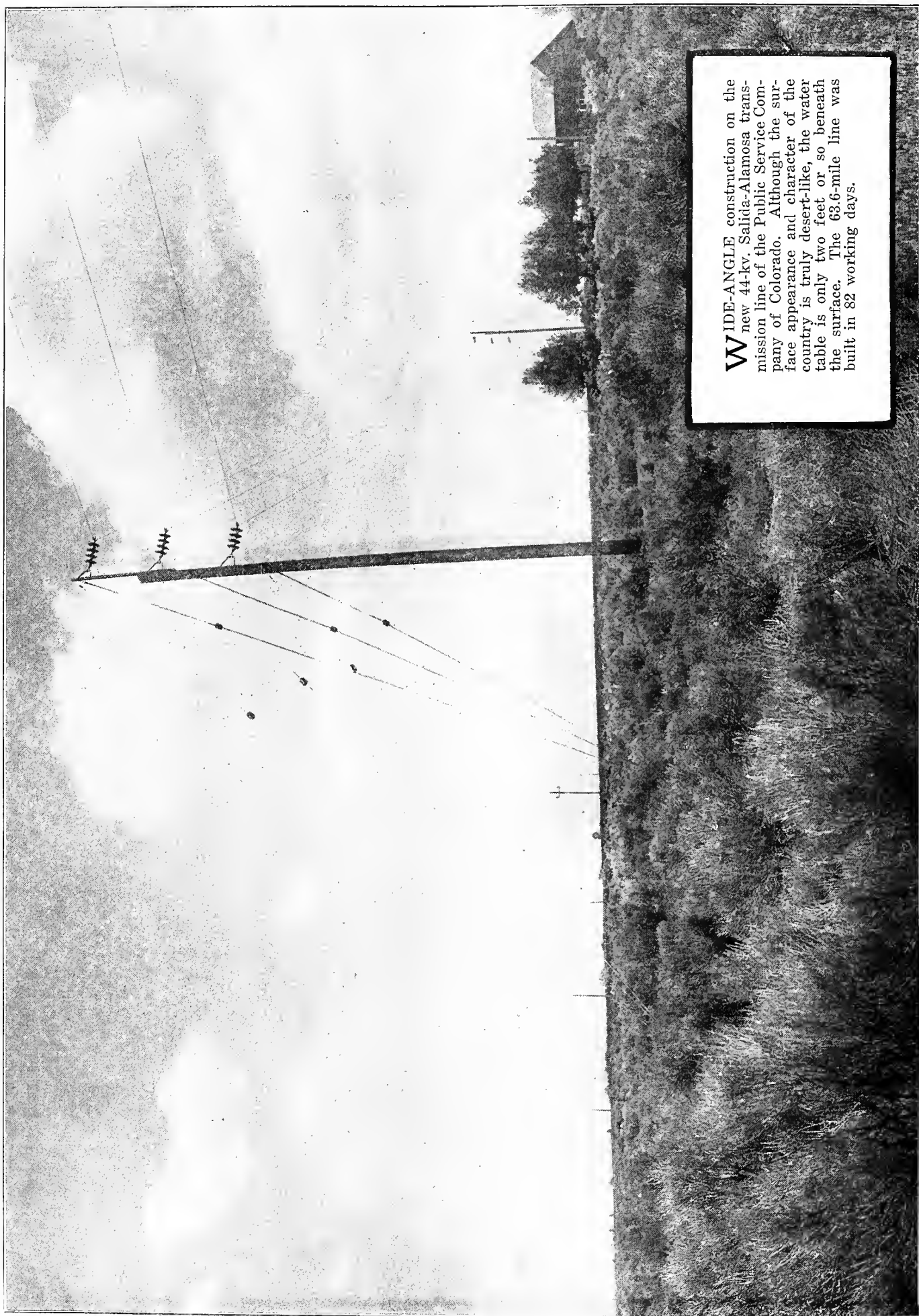
**S**TILL the battle of accident prevention goes on, fought vigorously in some sectors and completely overlooked in others. Some feel that accidents are predestined to occur in spite of human efforts to the contrary. Some believe that accident prevention and preventive education are nice theories but too costly. Still others are just plain procrastinators. But few have faced the cold facts and fully analyzed them.

Statisticians of authority report that an average of some 2,750,000 industrial accidents occur annually, each causing the loss of more than one man-day. Considering this and considering further the retarded production, reduced efficiency, and lowered morale, is not serious effort in behalf of accident prevention well worth while?

---

#### An International Engineering Conference in Japan

**P**OSSIBLY because engineers on the Pacific Coast are closer to Japan and more in touch with its engineering problems and achievements, the announcement that plans are under way for the holding of an international engineering conference in that country will be received with more than passing interest. According to press reports, Dr. M. Kamo, president of the Japanese Society of Mechanical Engineers, has announced that co-operation from the government of Nippon has been assured and that a great engineering conference will take place in that country in the fall of 1929. Many engineers have expressed a sentiment in favor of learning at first hand of the engineering progress and accomplishment in the Orient. This is particularly true in the West on account of the progress made in Japan in the development of hydroelectric power. At any rate, it is certain that the proposal to hold such a conference in Japan will meet with hearty support in this section of the country.



**W**IDE-ANGLE construction on the new 44-kv. Salida-Alamosa transmission line of the Public Service Company of Colorado. Although the surface appearance and character of the country is truly desert-like, the water table is only two feet or so beneath the surface. The 63.6-mile line was built in 82 working days.

# Ryan Laboratory Opens Untouched Field of Electrical Investigation

By J. T. Lusignan, Jr.

Stanford University, Palo Alto, Calif.

**T**HE new Harris J. Ryan High-voltage Laboratory, which was recently completed and placed in operation at Stanford University, is probably the foremost of its kind in the world in regard to size, capacity of equipment, and facilities for high-voltage research. The authorities responsible have thus thought to furnish ample means for meeting the needs of the power industry for graduate engineers well trained in high-voltage phenomena, and for assisting in the solution of problems encountered in long-distance power transmission practice. The existence of this laboratory is largely made possible through gifts from various electrical concerns, contributed principally in recognition of the work of Dr. Ryan who, with his associates in the old high-voltage laboratory, built in 1913 but since outgrown, assisted materially in the development of the insulating supports and conductors for the present high-voltage systems on the Coast up to and including the three great 220,000-volt systems.

## Building

The main laboratory building is a 173 x 60-ft. steel-frame structure covered with corrugated Transite. The distance from the floor to the lower chord of the roof trusses is 55 ft. One side of the building faces the right-of-way set aside for the 1,000-kv. 3-phase transmission line. Three 40 x 50-ft. doors on that side allow proper clearances for the high-voltage leads to be brought into the building to the transformers. These doors are so well mounted that they may be moved easily by one person.

All of the inner surface of the building is painted drop black so that with all doors and ventilators closed the darkness is photographically complete. This feature facilitates the observation and photography of corona and other phenomena incident to high-voltage tests within the building and under ideal conditions.

Immediately adjacent to the main building is a smaller, 2-story concrete structure containing the power room, with its motor-generator sets and main switchboards, offices for members of the faculty, and rooms for instruments, equipment, photographic work, and seminar classes.

The main transformer set of the laboratory was

***I**N recognition of his invaluable contributions to the advancement of electrical science the donors of the new Stanford University laboratory have named it the Harris J. Ryan laboratory. The high-potential equipment installed there opens a wide field for advanced research and undoubtedly will lead to further advances in the understanding of electrical phenomena.*

designed by A. B. Hendricks, Jr., of the General Electric Company and built at the Pittsfield works of that company. The bank consists of six units arranged for "chain" connection and has a normal single-phase rating of 2,100 kv., the highest yet attained at a commercial frequency.

Each transformer unit has a normal rating of 350 kva., 2.3/350-kv. They all are of the familiar shell type with the primary and secondary windings on the center leg.

All but two of the transformers, which commonly are called the "line" units, are equipped with a third winding called the exciting winding. This third winding in reality is part of the high-voltage secondary winding and furnishes the excitation for the next higher transformer in the chain connection. Windings themselves are of the concentric type and fit compactly around the core leg. The primary winding is innermost, the exciting winding next and the high-voltage on the outside.

The lower end of the 350-kv. winding is grounded to the transformer core and tank. A film cut-out is placed in that end to provide for the insertion of an ammeter to read the current in the high-voltage winding. The upper end of this winding is connected to the cap on the high-voltage terminal and to one end of the 2.3-kv. exciting winding. The other end of the exciting winding is brought up through the center of the high-voltage terminal, insulated from the latter for 2.3-kv. by means of a small Herkolite tube. (See Fig. 1.)

## Split Primary

Unique among the features of these transformers is the manner in which the windings have been arranged to secure low leakage reactance and yet ample insulation between them. The 2.3-kv. primary winding of each unit is in two parallel sections, one above the other on the core. The lower half supplies the kva. for the lower end of the high-voltage winding while the upper one is wound to supply the kva. for both the upper end of the high-voltage winding and all of the exciting winding. The exciting winding occupies only the upper half of the core and is very closely coupled with the primary turns from which it receives its excitation. Thus the leakage reactance between them is very small. The advantage of this is readily apparent when the

exciting windings are connected in for chain connection because thereby the reactance of the set is kept down to a reasonable figure, eliminating the bad features of a large shift in phase angle and instability of voltage control. This desirable condition usually was difficult to obtain in former high-voltage set-ups using several units.

Impedance of the transformer set is made up almost entirely of reactance and measures as follows: one unit only, 3.8 per cent; two units "chain connected", 6.9 per cent; three units "chain connected", 12.4 per cent.

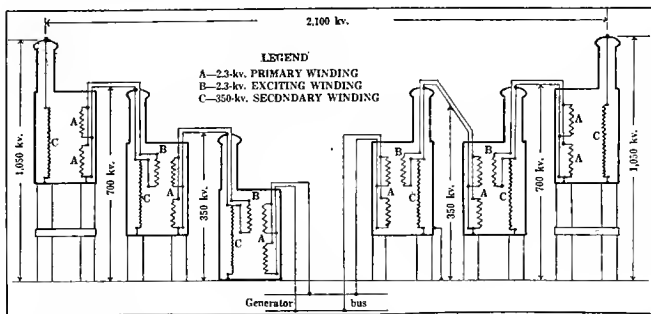


Fig. 1. Schematic diagram explaining chain connection whereby more than two million volts is obtained between terminals.

Fig. 1 shows a diagram of the six transformers connected in "chain" for obtaining 2,100 kv., single-phase between line terminals, and 1,050 kv. to ground. As may be seen from the diagram the set consists essentially of two separate halves or legs each with its ground, middle, and line transformer units. The primary leads of the two ground units are connected to the same generator busbars, but with one pair of leads reversed with respect to the other thereby giving double leg voltage between the two line terminals.

As shown in Fig. 1 the tank of the first unit is at ground potential, but the high-voltage terminal of that unit connects to the tank of the next or middle unit. Thus the latter must be insulated from ground for 350 kv. This is done by means of a set of three Herkolite cylinders 3 ft. in diameter, 5 ft. high and with walls  $\frac{3}{4}$  in. thick. From crushing tests made on other cylinders of the same material, it is estimated that the factor of safety is over 100/1, which is ready assurance against any danger from vertical mechanical forces. The top or line transformer-unit tanks require an insulation from ground of 700 kv., hence two sets of these cylinders are used supporting the tanks about 10 ft. above the floor. A triangular wooden framework of maple 5 in. thick separates these two sets of cylinders. Thin felt rings are used at both ends of each cylinder to protect the edges of the cylinder walls and to aid in distributing the weight. The weight of each transformer complete is 22 tons.

Each transformer is equipped with a voltmeter coil. This consists of a few turns placed near the lower end of the core so as to link with the same flux as the average turn of the high-voltage winding. Thus a direct indication of great accuracy may be obtained regardless of load or power factor. Principle errors that could arise there would be due to the resistance of the high-voltage winding and the voltmeter coil itself, but these are negligible.

Leads are brought out to the cover of the transformer for connection to the voltmeter. Ratios provided for, between the high-voltage winding and voltmeter coil, are 500/1, and 1000/1.

Tests with a single transformer showed the error of the readings thus obtained to be only about 0.3 per cent. With three transformers in chain, however, the voltmeter coil of the ground unit does not compensate for the reactive and transient rise in voltage through the other two transformers.

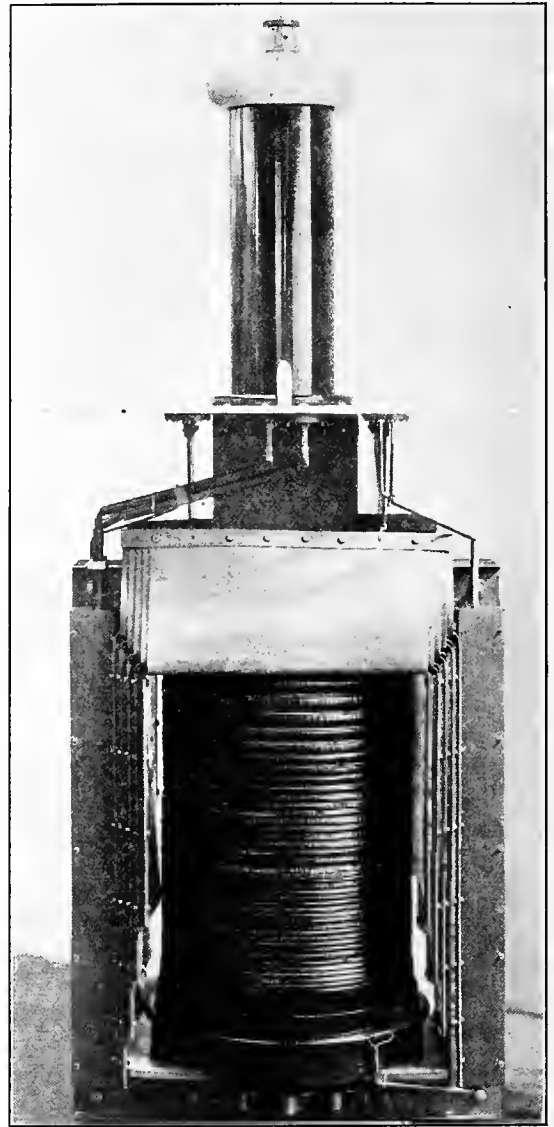


Fig. 2. View of one of the 350-kv. transformers untanked and showing construction details.

Hence a voltmeter on the ground unit reads low. The magnitude of this error as determined by numerous tests varies according to the nature of the load and connecting leads. This has been shown to be largely attributable to high-frequency disturbances set up by brush discharges and the like which appear at such high voltages. In factory tests with non-inductive resistance loads these high-frequency disturbances have been largely damped out and the transient rise reduced considerably. Part of the first work planned to be done in the new laboratory is the development of a 1,000-kv. water-column resistance that will serve as a non-inductive high-voltage load and in addition serve as a potentio-



meter for checking calibrations of needle gaps and sphere gaps at high voltages.

No-load loss for a single transformer at normal voltage is 20.8 kw., the exciting current being 10.8 per cent. Open-circuit measurements show that



Fig. 3. View from the operating platform looking through the three 40-ft. doorways out upon the right-of-way for future experimental transmission lines. This view shows only the four center transformers and the needle-gap overhead. It may be noted that only one of the center transformers is mounted on the floor. This is because one of these center units is used as a line unit for the 3-phase connection shown in Fig. 5. Thus it must be insulated for 350 kv. from ground.

the current is leading under all no-load conditions. The power factor as read at the ground unit is 0.663 for one transformer, 0.573 for two "chain connected," and 0.435 for three. No-load loss for three units at normal voltage "chain connected" is 50 kw.

On the line terminals of the set, each rated at 1,050 kv. above ground, are choke coils made up of reactance turns and carborundum resistance rods in parallel. These are to help check voltage surges and to damp out high-frequency oscillations. To shield the outer rims of these and reduce the brush discharge therefrom a spun aluminum torus was fitted around each coil. The outside diameter of the torus is 6 ft., while the radius of curvature of its edge is 6 in.

### Power Equipment

Two motor-generator sets supply power for laboratory purposes. The motors are of the salient-pole synchronous type, 3 phase, 6 pole, 1,200 r.p.m., 500 kva., and 4 kv. The generators are wound for both single and 3-phase operation. Their single-phase rating is 1,050 kva. Windings are capable of series and parallel connection giving either 1.15 or 2.3 kv.

The generators were specially designed for the Ryan laboratory by R. W. Wieseman of the General Electric Company and are capable of giving remarkable sine-wave generation under all conditions of load. This is a highly desirable asset in high-voltage testing work where circuits of considerable capacitance are involved. If the voltage wave contains even small harmonics, especially tooth ripples, the capacitance of the circuit will amplify these greatly and cause a sawtooth instead of a smooth current wave.

These sine-wave generators have cylindrical

rotors with large uniform air gaps. The field coils are arranged to give a sine-wave flux distribution, while the pitch and distribution of the armature coils are such that harmonics in them are reduced to practically zero. A heavy distributed damper

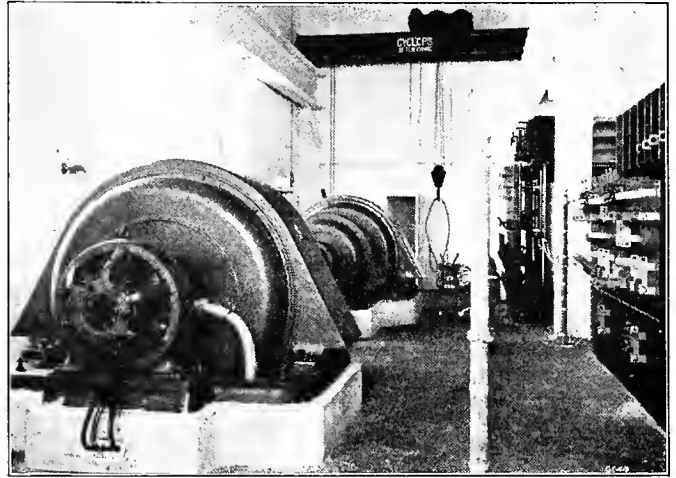


Fig. 4. Power room at new Stanford laboratory showing the two motor-generator sets and the control panels.

winding is placed around the rotor over the pole faces to eliminate the double-frequency armature reaction of the single-phase armature currents and thus prevent the induction of triple-frequency voltages back into the armature winding.

Factory tests were made on the generators under all conditions of load varying from no-load to direct short circuit, and included one load of pure capacitance. Oscillograms of voltage and current obtained



Fig. 5. Flashlight view of interior of laboratory showing all six units of the transformer bank. In the right foreground may be seen the switch panel controlling all transformer primary leads.

through these tests showed waves of practically perfect sine nature in all cases. These results are deeply gratifying in that they are at once a ready assurance that all tests with the transformer set can be made starting with a voltage of standard wave form on the generator busbars. This feature is a long step toward consistent and reliable test results.

Direct-connected exciters on each end of each shaft furnish separate field excitation for each

motor and each generator. Motor-driven rheostats in the exciter armature circuits provide comparatively close regulation. The fine degree of voltage regulation desired and necessary in the sine-wave generators is provided by an additional motor-driven rheostat in the field of each exciter supplying a generator field. These rheostats are all controlled from the main board by means of push-button switches. A hand-operated rheostat in the field circuit of each exciter supplying the synchronous motors provides the necessary close control there. This arrangement facilitates a smooth and sensitive regulation of generator voltages.

Switches for changing the connections of the generator windings and for paralleling the machines themselves are located in the power room. From the generator buses underground cables connect with a small selector switchboard on the floor in the center of the main laboratory. All the transformer leads are brought through conduit under the floor to that switchboard. From that point therefore, connections for obtaining the various transformer arrangements can be made. (See Fig. 5.)

The principal arrangements which may be obtained with the set of six units are as follows:

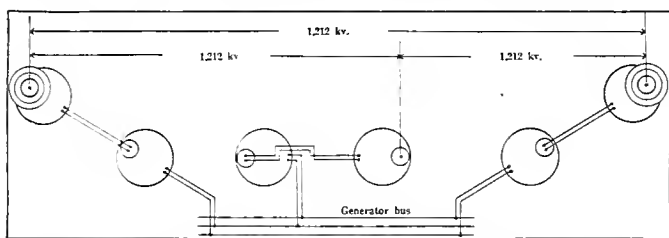


Fig. 6. Schematic diagram showing 3-phase connections. From this it will be apparent why it was necessary to insulate one, and only one, of the center transformers from the floor.

potentials to ground, 350 kv., 700 kv., and 1,050 kv.; potentials between lines, single-phase, 700 kv., 1,400 kv., and 2,100 kv.; potentials between lines, 3-phase, 606 kv., and 1,212 kv. With any of these different arrangements the full rated capacity of the set, i.e., 2,100 kva., can be obtained by proper paralleling of the transformer units and the generators.

Near the center of the building and facing the transformer set is the control platform upon which are the two control tables, one for each motor-generator set. On these are located the connections for the portable instruments and the push-button switches for controlling generator voltage and the main and generator field circuit breakers. Above the control platform and extending along one side and the end of the building is an observation gallery. In addition there is an overhead walk on the lower chords of the roof trusses extending the entire length of the building beneath the roof peak, for making observations from above.

The main 6-unit transformer set occupies the major part of the floor space, or about 120 x 60 ft. The remainder of the building is set aside for the equipment formerly in the old high-voltage laboratory but now to be used for elementary instruction and for research at lower voltages. Everywhere about the line terminals of the main transformer

set and all attachments to them, 20-ft. clearances have been provided to prevent possible arcovers and to maintain stable high voltage conditions as well



Fig. 7. Showing some of the physical arrangements of the building and its contents. The operating gallery may be noted in the background at the right. Above the operating gallery may be seen the visitors' observation gallery.

as to lessen danger to life and equipment. (See Fig. 7.)

About 200 acres in all were set aside by the university for the use of the laboratory. This includes a right-of-way 300 ft. wide extending from the laboratory for a mile and a half with provision for prolonging it further for a distance of seven miles. Along both sides of this right-of-way are to be erected towers for the experimental 3-phase line with cables stretched between. The high voltage lines are to be suspended from these transverse messenger cables, allowing conductors to be arranged at any desired spacing, height, or configuration.

#### New Research Work

Extensive tests of corona loss are to be made on numerous conductor and insulator specimens up to a million volts, 3-phase. In relation thereto will be the further development of the high-voltage wattmeter for the measurement of these losses directly at the line. Work on such a wattmeter by faculty men and graduate students has been progressing for the last three years, the last stage reached having taken it up to the limit of voltage capacity

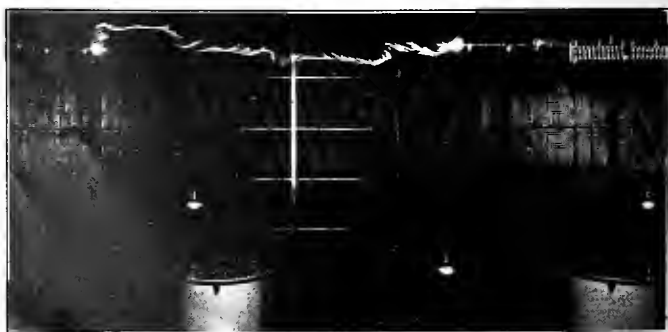


Fig. 8. Discharge of more than two million volts across a needle-gap 20 ft. in length.

of the old laboratory. Its extension with the higher voltages of the new laboratory is part of the work planned for the ensuing year.

Facilities of the laboratory will permit of the study of "space charges" about conductors and insulators in the regions of potentials greater than heretofore available. The problem of determining the factors contributing to subnormal flashover insulators now can be attacked with greater thoroughness and confidence. Plans are under way toward the evolution of a high-voltage impulse generator which will permit the investigation of problems relating to lightning protection of property, lightning flashovers of insulators, and all conditions involving transients of steep wave fronts.

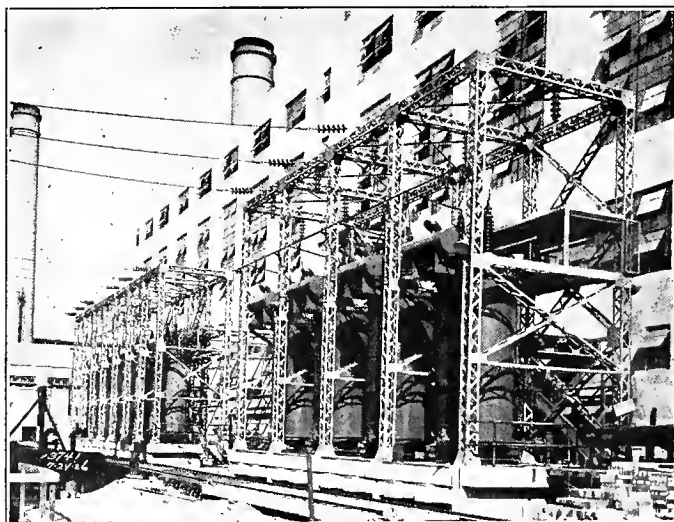
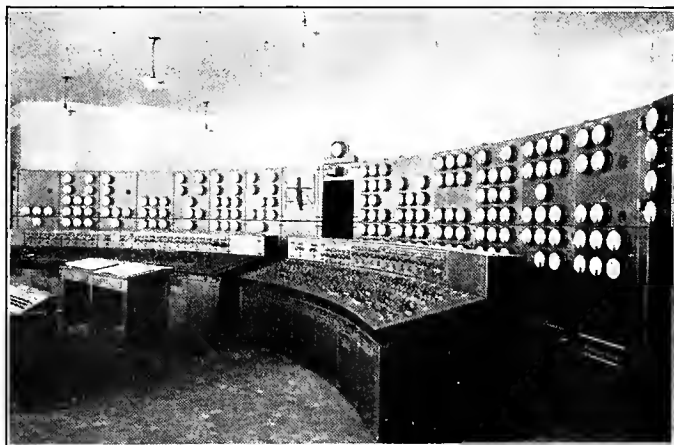
With the large space available inside of the laboratory alongside of the main transformer set conditions are ideal for making high-voltage tests on the active part of full-size towers and switch structures, using the advantages furnished by the light-proof feature of the building. As a further utilization of this space field tests are planned in the calibration of measuring gaps in the region above one million volts, about which so little is definitely known. In tests and demonstrations on the set at the factory and in the laboratory a point gap of 20-ft. spacing was arced over 50 or more times, so that there is every assurance that the equipment

is capable of creating a sufficiently high potential. If it is assumed that the rule of 10 kv. per in. for breakdown of air between points still holds at this large spacing of 20 ft. then the arcover voltage mentioned was in the neighborhood of 2,400 kv. In any event it indicates that a voltage well over the normal 2,100-kv. rating of the set was reached.

Dr. Ryan has been relieved of the major part of his duties in the undergraduate division of his department in order that he may give the greater part of his attention to the work of the graduate department, and to the furtherance of studies in high voltage. The operations in the new laboratory will be in charge of Prof. J. S. Carroll, assistant director of the laboratory, and will be carried on largely by graduate students.

It is hoped that the laboratory will contribute much to the electrical art and thereby justify the faith which the patron companies and the university have placed in it when they made its existence a reality. It surely should serve to assist the power companies materially in the solution of problems incident to present high-voltage lines, and thereby place transmission of large blocks of power on a still more economical and reliable basis. What effect it will have in fostering any movement toward the use of higher line voltages than the limit now reached, 220 kv., is problematical.

**T**HREE late views of the Long Beach steam plant of the Southern California Edison Company. At the right above: main switchboard which is located in the switch house remote from plant noise. At the right below: outdoor transformer rack, the 60,000-kva., 11/70-kv. bank for the last 55,556-kva. unit installed appears at the right. Immediately below: interior of one of the new furnaces showing the water-cooled side walls and the water-cooled front wall above the burners.



# Combination Domestic Schedule Including Use of a Load-Limiting Device

By M. W. Phillips

Manager, Ojai Power Company, Ojai, Calif.

**B**EFORE considering the new domestic cooking and heating rate which has been developed by the Ojai Power Company, it will be necessary to thoroughly understand the condition affecting the load carried and the service rendered by this utility because there are so many local factors that might influence the determination of a rate for this type of service.

The Ojai Valley is a small valley or "nest" in the mountains fifteen miles inland from Ventura, Calif., about twelve miles long and ranging from one to five miles in width. The climate is delightful, the valley being far enough from the ocean to be almost entirely free from fog and having sufficient heat in intervals of short duration during the summer to develop a fine grade of oranges on the east end offset by occasional frost in the west end during the winter to give the invigorating winter climate so much desired by tourists. The principal sources of revenue from which the inhabitants derive their livelihood are tourists, wealthy winter residents and the production of fruits, chiefly oranges.

The leading men of the community tried for several years to induce outside interests to serve the valley with electricity, but were unsuccessful and finally organized the Ojai Power Company with the idea of serving the district with electricity and water for domestic use. The growth of the region was rapid and in the early stages of the World War arrangements were made with the Southern California Edison Company for wholesale service over a 15-kv. line from Ventura. Practically every irrigation plant in the valley was converted from gas-engine to electric drive within a period of two years and this load has increased until at the end of four years approximately 1,200 hp. in motor load has been secured, 95 per cent of which is used for irrigation.

The condition then presented itself of an overloaded distribution system that demanded reconstruction with materially increased capacity for handling a strictly seasonal load and nothing but an insignificant amount of lighting load in the winter time. Because irrigation rates themselves would not provide sufficient revenue to justify the investment in plant equipment, the necessity of securing

***F**ACED with the necessity of building up winter load to offset a summer irrigation peak, this company has developed a large amount of residential heating load by means of a successful combination domestic rate schedule which incorporates the use of a load-limiting device for the purpose of limiting the customer's demand and at the same time reducing his minimum charge.*

additional load with opposite peak characteristics of irrigation became immediate. A combination domestic rate was in effect and the company was securing a number of customers with ranges and water heaters on this rate which materially helped, but it was impossible to acquire any large volume of domestic heating load on account of the minimum charge based on the connected load.

The writer studied this problem for two years in an endeavor to find a solution

that would prove sufficiently attractive to the eastern people who have winter homes in the valley to warrant them installing electric heating equipment. Tests were made and records kept with demand meters and curve tracers. It was found that the demand never exceeded 50 per cent and averaged between 30 and 40 per cent of the connected load for residences, the lower percentage obtaining where the ratio of air heating to other connected load was high. This led to the conclusion that a minimum charge on the connected load basis was unfair and unjust to the consumer in its application to service of this character and only served to defeat the object sought.

Demand meters were thought of and tried but there was always the possibility of the thoughtless connection of a greater load than necessary with the attendant complaint and ill will of the consumer over an excessive minimum charge by reason of the high demand. Also the extra cost of the metering equipment was a factor and the fact still remained that there must be service equipment of sufficient capacity to take care of the maximum demand.

After considerable correspondence with engineers of the California State Railroad Commission and a visit from C. Grunsky for the purpose of satisfying the commission that special consideration should be given to this case, the suggestion was made by A. V. Guillou, engineer of the gas and electric division of the commission, that a load-limiting device which could be set to trip at some predetermined amount be applied. The device was to be set at a point equivalent to the amount of load for which the consumer applied and on which the minimum charge was based.

This suggestion was adopted and for an installa-



tion rated at 75 amp. or less a standard 75-amp. contactor with a thermal overload relay is used. This equipment is similar to a motor starting switch with connections reversed so the load comes through the overload relay first. Because lighting is not

summer to the demands of the cooking and water heating where means are provided for the company to seal the heating circuits in an open condition. If this service is contracted for on a yearly basis the minimum will be made cumulative annually

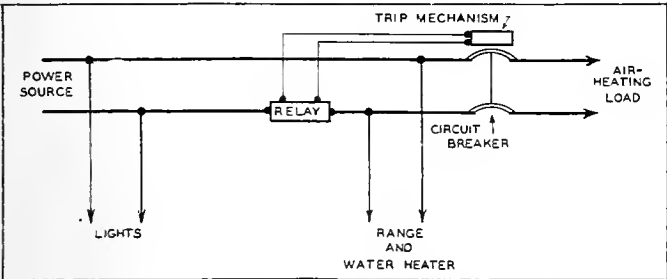


Fig. 1. Schematic wiring diagram showing location with reference to lighting, cooking and heating circuits of load-limiting equipment for installation rated at 75 amp.

a factor considered in the demand charge, the lighting circuits are connected ahead of the overload equipment. While ranges and water heaters are considered in the demand and must be fed through the overload equipment, it might prove inconvenient or annoying to have them disconnected at some inopportune time so they are connected between the overload relay and the contactor. The remainder of the heating load is connected on the load side of the contactor and is subject to disconnection when the total load exceeds the amount contracted for by the consumer. (See Fig. 1.)

For loads of greater magnitude, plain magnetic contactors of suitable capacity are used. The control circuit is actuated through the closed contacts of an over-current relay, the coil of which is energized by the secondary circuit of a three-wire current transformer and in series with which is also the current coil of a 5-amp., 220-volt meter. (See Fig. 2.) Installations of over 30 kw. limit ratings

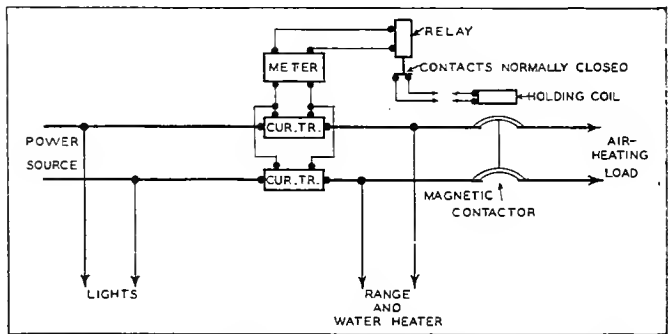


Fig. 2. Schematic wiring diagram showing location in line with reference to lighting, cooking and heating circuits for installation exceeding 75 amp. rating.

Table II.—Rate Schedule for Combination Domestic Service Including Provision for Load-Limiting Device.

OJAI POWER COMPANY Revised Sheet CRC No. 79E  
OJAI, CALIF. Cancelling Sheet No. 74E

SCHEDULE C-2

(Cancelling schedules C, D, E, F and H)

COMBINATION DOMESTIC SERVICE

Applicable to combination lighting, heating, cooking and small power service.

RATE.

First*	30 kw-hr. per meter per month	11.0 per kw-hr.
Next	220 kw-hr. per meter per month	3.0 per kw-hr.
All over	250 kw-hr. per meter per month	2.0 per kw-hr.

\* For residences, flats or apartments of more than seven rooms add 5 kw-hr. per additional room to the first block.

Minimum Charge.

First 7 kw-hr. or less of connected capacity exclusive of lighting and lamp socket devices	\$3.50 per month
Over 7 kw. of connected capacity exclusive of lighting and lamp socket devices	.75 per month

SPECIAL CONDITIONS.

- (a) Service will nominally be 110/220 volts three-wire, single-phase alternating current.
- (b) This rate applies only where a domestic consumer installs and uses appliances other than lamp socket devices of at least 2-kw. capacity for residences, flats or apartments of 8 rooms or less and 5-kw. for residences, flats and apartments of 9 rooms or more.
- (c) Bath room, halls and cellars are not classified as rooms.
- (d) Connected load will be taken at the name plate rating of all heating and cooking apparatus permanently installed and which may be connected at any one time computed to the nearest one-tenth of a kilowatt, or at the consumer's request and at his expense, a suitable load-limiting device may be installed by the company, which automatically prevents use of connected capacity in excess of a predetermined amount.
- (e) Single phase motors aggregating 5 hp. or less may be combined with cooking and heating under this schedule, in which case each horsepower of connected load shall be equivalent to one kilowatt of connected load in determining the minimum charge.
- (f) When consumer installs air or radiant heating equipment of at least 3-kw. total capacity, the minimum will be made cumulative for the year.

Table I.—Monthly kw-hr. Consumption and Billing for a Six-room House with 29-kw. Connected Load and 15-kw. Load-Limiting Device.

Month.	Kw-hr. Consumed	Total Bill
November 1925	846	\$ 21.82
December	1,069	26.28
January, 1926	926	24.42
February	1,134	27.58
March	570	16.30
April	544	15.78
May	463	14.16
June	267	10.24
July	115	5.85
August	171	7.53
September	278	10.46
October	320	11.30
Total	6,703	\$191.72
Yearly minimum		\$114.00
Option of 7 months heating on connected load basis, minimum would be		190.73
Actual yearly bill would be		212.63

are usually three-phase and two over-current relays are required.

This service may be contracted for over a period of six or seven months during the winter season and then the minimum may be reduced during the

similar to the various seasonal schedules in force by most companies for agricultural purposes. The company believes this to be fair and just as the load is more definitely seasonal than irrigation, which may overlap seriously its seasonal characteristics during a winter of less than normal rainfall.

To demonstrate the results of such a schedule upon an average consumer, figures covering a period of twelve months in the home of the writer are shown in Table I. The home is a six-room bungalow in which there is no means of using anything but electricity for light, heat and power. The dining and living rooms are adjacent with a permanent opening between and are heated with stationary floor heaters with thermostatic control. The bath room has an inset wall heater and the remainder of the house is heated by 2 and 3-kw. portable heaters. The total connected load is 29 kw. and the load-limiting equipment is set to operate at 15 kw. So far the installation has shown maximum convenience, comfort, satisfaction and

economy. The cost of operation of this equipment as shown in Tble I is based upon the rate schedule reprinted in Table II.

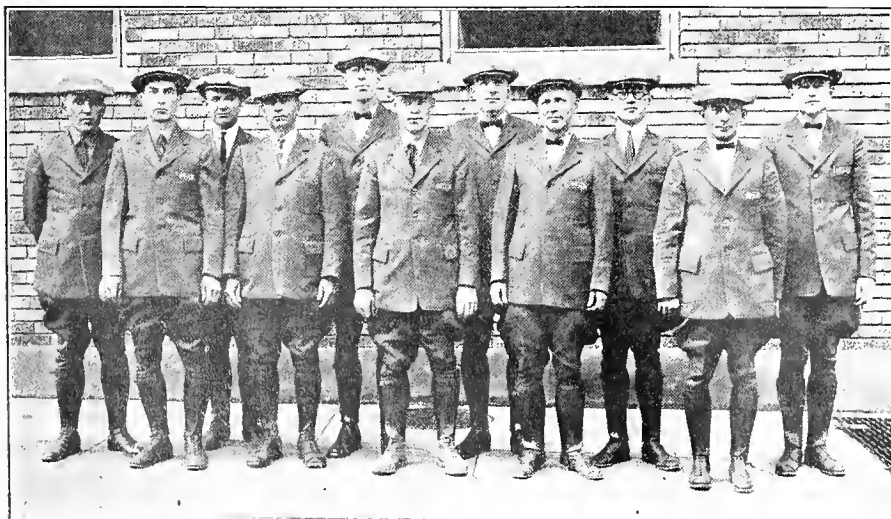
While the seasonal characteristics and optional features may not appeal to other light and power companies enjoying a good load curve during the winter months, it would seem that this plan of limiting the demand and thereby reducing the minimum charge would be of material advantage to any company at all interested in residential heating. In the case of the Ojai Power Company the results obtained from this type of schedule have been highly satisfactory. An increase of 20 per cent in the number of combination lighting, cooking and heating consumers to which the schedule applies shows a 100 per cent increase in connected load, and a 48.4 per cent increase in gross revenue. Although the increase in demand is comparatively small, it made very little difference as the winter demand at the present time is only 50 per cent of the summer demand caused by irrigation.

### Uniforms Adopted for Meter Readers and Service Men

FOR the purpose of establishing suitable credentials for its service men, and at the same time to tone up the appearance of these men, the Pacific Power & Light Company, Portland, recently has put into effect a rule requiring all men whose work takes them to customers' premises for any purpose to wear a uniform. This uniform consists of sack coat, breeches, puttees or high boots, and a cap of the outing or golf type. The coat and breeches are of olive whipcord, and the puttees are tan or black. On the breast pocket of the coat the initials of the company are embroidered in white letters on a black strip of cloth. A flap, which is tucked into the pocket during working hours, may be brought out and buttoned over the top of the pocket covering the company initials during times when the men are not on duty, so that the suit may be worn as an ordinary outing suit without taking on the appearance of a uniform when off duty.

All meter readers and men doing service work on customers' premises are required to buy and wear these uniforms. Measurements are taken in accordance with certain tailoring standards, and the suits are all purchased from one tailor, so that a more economical price can be procured. The men are then given \$5 per month extra on their salaries to help them to purchase the suits and to keep the suits clean.

In some districts the company had experienced difficulty on account of appliance salesmen and others representing themselves as company men to gain access to customers' homes, so that the need of a positive identification was felt. Furthermore the company felt that its customers were entitled to have their service performed by clean and neat appearing men. The donning of the uniform has resulted in raising the morale of the men and in causing them to take greater interest and pride in their personal appearance. The action of the customers to the innovation has been reported as favorable.



All employees connected with the Pacific Power & Light Company whose work takes them onto the premises of customers are required to wear a standard uniform such as that shown on the men in the accompanying photograph. This group includes meter readers and service men. The uniform consists of olive whipcord jacket and breeches with black or tan puttees or high boots. On the breast pocket of the coat are the initials of the company embroidered in white to serve as credentials for the men. A flap covers the initials at times when the men are off duty.

# Is the Customer Always Right?

By J. R. Wilson

Quality Electric Works, Los Angeles, Calif.

**I**N these days of high pressure salesmanship and questionable competition a contractor has a difficult job in selling service as against low price. A satisfied customer is the best advertisement any firm can have, but sometimes it costs more to satisfy a customer than his trade is worth. On the other hand a dissatisfied customer can do a contractor more harm sometimes than may appear possible to one who has not had personal experience in the matter. In no other line of construction does the contractor have to contend with as many difficulties in satisfying a customer as does the man engaged in the electrical business. The causes which create this condition are not hard to find. Most of these causes are beyond the control of the contractor and are due to fundamentals which pertain particularly to the science of electricity alone.

There are, however, some causes for which the contractor may be responsible, and which generally are inexcusable. To be in a position to answer the question which heads this article it is necessary to array the evidence on both sides of the case.

## Customer Ignorance

The greatest obstacle an electrical contractor has to contend with is the customer's natural and excusable ignorance of the laws of electricity. These laws pertaining to life and fire hazards are only remotely understood by the majority of the users of electricity. It is a source of satisfaction to say that this ignorance gradually is being dispelled through the efforts of the inspection departments and newspaper campaigns being conducted by the public service corporations.

It is easy to contend that the satisfaction of low price can never equal the bitterness of the customer's eventual realization of inferior quality. But when you are trying to sell him superior quality against low price, immediately you are confronted with this same ignorance pertaining to electrical fittings and devices. Due to this ignorance most users of electricity seem to think that if their motors run when a switch is closed, or the light burns when the socket key is turned they have first class installations.

In selling a man a suit of clothes you can talk in a language he understands, but in comparing the merits of two motors or other items of electrical merchandise usually you are "talking over his head." And yet quality should be the preponderant factor in the selection of electrical equipment because of the nature of the abuses to which it will be subjected.

The greatest of these abuses is neglect on the

part of the customer. It is surprising the treatment a man will give a motor, which may have cost him considerable money. Usually it is located down in some dark and dirty corner on the floor or up on a rafter or platform where periodical inspection usually is wilfully neglected. And yet he expects that same motor to run along without any other attention than an occasional "dose of oil." And I say "dose of oil" intentionally

—he has been told to oil his motor and, by gosh, he is going to oil it—with the usual result, oil soaked windings and wiring, and the eventual burn-out or fire and the large repair bill. Would he accord the same treatment even to an Ingersoll watch? I don't believe he would.

## What is the Answer?

In the face of these conditions, with which all electrical contractors are more or less familiar, what is the panacea with which we are going to overcome our handicap of low price competition? There is only one answer to this question, and that is service; but we are immediately confronted with a man sized problem.

What is service? This word has been so abused by some contractors that a large number of prospective customers will no longer listen to any price argument whose basis is service. On the other hand it is unsafe to stress the service feature with some prospects. If they do give you the contract they literally expect you to move your stock of materials and your workmen to their place of business and give your entire attention to no other work but their particular job.

A certain amount of personal attention should be given to each customer by the contractor. This attention is automatically taken care of where the contractor is his own estimator because he comes in personal contact with the customer. Where he employs an estimator his personal contact may come through mutual friends or club and lodge activities. A great many large contracts are influenced by the good fellowship and confidence engendered through membership in luncheon or golf clubs.

All of these conditions are indications of the progress of modern business. The old axiom of "the public be damned" has given way to the modern one of "the public be served." The old-time contractor who was a pioneer in the electrical game may have been able to get away with some unethical deals owing to the ignorance of the public and lack of competition, but not so today.

No contractor today can long survive unless his business organization is so built that each unit functions to the maximum degree of efficiency. This

*"Business is sensitive,  
It comes only where it is invited  
And stays only where it is well treated."*

efficiency must be evident in all members of the contractor's staff and particularly so with those coming in direct contact with the customer.

### Stumbling Blocks

So many things can influence a customer for or against a firm that a contractor must keep a constant check on his organization if he desires to enjoy continued success. Among the things which detract from the desired pleasant relations between contractor and customer and for which the contractor himself is directly responsible, the following may be cited:

1. An incompetent estimator.
2. An incompetent stock keeper.
3. Slow deliveries of materials or tools.
4. "Skinning the job."
5. Incompetent mechanics.
6. An incompetent office force.
7. Poor bookkeeping methods.

An inspection of the foregoing list will reveal that each item has a direct bearing on customer relations. The inspection will also show that every item listed is directly within the contractor's control. Some electrical contractors are classified as very poor business men. This is no disgrace if considered as a fundamental proposition. To be a successful electrical contractor, a man should as a rule have spent a number of years as a practical mechanic. No man can be expected to learn two trades or professions at one and the same time and excel in both.

But after he has become a contractor he should endeavor to improve his business education in all ways within his power. This may be accomplished by membership in his trade association, by constant study of trade journals and books, and by studying the methods of those who have made a success of their business.

No contractor should allow his estimator's work to go unchecked for any length of time. A proper system of bookkeeping and costing of jobs will reveal an incompetent estimator in very short order. Also no estimator should be kept on the payroll if he shows a lack of knowledge of the latest code requirements. It is his duty to know and use all code rules which will benefit the contractor or the customer. The present code allowances in the use of 1,000, 1,500 and 4,000-watt circuits are examples of this thought.

### Then the Fun Begins

After an estimator has been successful in receiving the award of a contract the real test of efficiency within the organization begins. A chain is no stronger than its weakest link and it is the writer's opinion that aside from the labor proposition the weakest link is the stock room.

The stock room man is the most important part of a contractor's organization. The system he works by in delivery of material and tools will determine in a great measure the profit or loss on a job. He should have full charge of the trucks and should be provided with a simple perpetual inventory system to aid in keeping a check on his stock.

A competent stock-room man who can efficiently

handle the delivery, charge and credit system and other details of his job is worth more than any journeyman on the pay roll. More lost labor and job delays can be traced to inefficient stock room methods than to any other item in the category of contracting.

### The Labor Problem

The next item on the list is incompetent mechanics. It is safe to say that any contractor will claim he is competent to write a book on that subject alone. Most contractors have the tendency to side-step the labor issue and claim that there is no remedy. The writer does not hold with that belief although he does feel that it is not the duty of the contractor to educate mechanics at his own expense.

The labor problem presents three factors for consideration, which may be enumerated as follows:

1. Labor's duty to contractor and customer.
2. The contractor's duty to labor.
3. The customer's duty to the contractor and his labor.

Labor's duty to the contractor may be summed up in the following creed:

I will strive each day to perform a reasonable amount of work for the pay I receive. Realizing I am the representative of my employer, I will use my best efforts to do my work and to conduct myself in a manner that will satisfy the customer and reflect credit upon myself and my employer. Knowing that I am engaged in a business whose scope is becoming wider each day, I will devote a reasonable amount of my leisure time to study, by reading the latest books pertaining to the science of my craft, and by subscribing to at least one trade journal whose pages will keep me conversant with the latest devices for the use of electricity. Believing that only through honest effort and fair play can I expect steady employment and advancement, I pledge myself to safeguard the interests of my employer, and his customers, in every way within my power.

### The Contractor's Duty

The contractor's duty to labor may be covered as follows:

Knowing that only as my employees believe in and respect me can I hope to receive their whole-hearted support in my efforts to succeed, I pledge myself to abide by the following code of ethics in my relations with my employees:

1. I will not hold myself aloof from any employee who may wish to consult me upon matters of importance to himself or the business of the firm.

2. I will devote a part of my time to study of code requirements and the science of my craft, so that my employees may refer trade questions to me with confidence of receiving authoritative decisions.

3. While issuing reprimands where such are merited I will not fail also to give praise where and when due.

4. I will use my best efforts to so estimate my jobs and to so conduct my business that my em-



ployees will have a reasonable amount of time in which to perform the work assigned to them.

5. I know that only through the co-operation of my employees can I hope to attain the maximum of success, and realize that ideas are wasted unless given an opportunity for expression. I will hold and attend shop meetings at regular intervals where each employee will be given the opportunity to advance such ideas as may be of general interest or of particular benefit to the business. For those ideas which react to the success of the business a part of the monetary return shall be added to the regular pay of the employee responsible for such ideas.

6. My particular trade is beset with technicalities and requirements covering the safe-guarding of life and property which are mostly beyond the understanding of the customer. Knowing this ignorance creates a tendency toward fault-finding, I pledge myself not to use snap judgment against any employee whom I know to be a competent and trustworthy mechanic. If upon investigation I find that the customer is wrong in his complaint, I shall so inform him even though such course shall jeopardize my business relations with him.

7. Believing that only through confidence and fair dealing can I hope to have my organization function at its maximum efficiency, I pledge myself never knowingly to violate any code rule or use inferior materials, nor to request any of my employees so to do. Neither will I intentionally overcharge any customer on items of either materials or labor.

#### The Customer's Position

The customer's relations to labor should be as follows:

I believe in the honesty and efficiency of my contractor and feel he would not intentionally violate my confidence in him. I further believe he knows his business as I know mine, and that he would not knowingly employ any but competent workmen. I realize that my knowledge of electricity is limited and that I must depend upon him and his workmen to safeguard my interests regarding life and property damage which may result from faulty construction. Therefore I will not condemn his workmen on snap judgment, but will provide them an opportunity for explanation, where any reasonable doubt appears to exist.

#### Why an Account System

No person likes to be re-billed for items already paid for, or charged for materials or labor never received. Items 6 and 7 of the list are potential creators of this condition and may cause the loss of valued customers. The only real remedy is to adopt a simple, efficient system of accounting which will act as a constant check against mistakes of this nature.

With the excellent accounting system devised and adopted by the Association of Electragists, International, there is no excuse for any electrical contractor allowing inefficient or obsolete bookkeeping methods to exist in his organization. This system is simple and easy to understand and gives a con-

stant set-up of all the essential details pertaining to the financial end of the business.

The estimating end of the business also can be handled with the maximum of efficiency through the adoption of the Electragist system of estimating. No estimator who is alive to the latest developments in the science of his calling should neglect to investigate this modern exposition of practicable, proved estimating methods.

In summing up our evidence in the case of customer versus contractor, we see that the jury cannot return a verdict upon the evidence as presented. It will be necessary for the customer to prove that he did make due allowance for his ignorance of electrical construction practice, also that he was in no way responsible for any of the delays that occurred.

It will be necessary for the contractor to prove this his—

1. Estimator is competent,
2. Stock room methods are correct,
3. Labor is competent and efficient,
4. Bookkeeping system is modern,
5. Office force is efficient.

Gentlemen, we rest our case.

### Australia Takes Slowly to Electric Household Devices

THE Australian market for electrical household equipment has a long way to go before it reaches the point of saturation, according to a report of the electrical equipment division of the Commerce Department made public recently. With the increasing use of electricity in Australian homes, however, the possibilities of this market for the sale of American devices are very promising.

At the present time there are about a million and a half dwellings in the commonwealth and less than a third of these are equipped with electricity. Even those thus equipped have been extremely chary in the adoption of modern labor saving devices. For example, only 2 per cent of the electrically equipped houses in Australia have vacuum cleaners, only 1 per cent have electric toasters and electric kettles. The electric flat-iron is the one popular appliance among the Australian housewives, being found in three-quarters of all the houses wired for electricity. Seven per cent of the houses have electric fans and 20 per cent have electric radiators. Australian ladies, the report indicates, are not partial to the electrical curling iron and the annual sales in the entire commonwealth are less than 100.

American electrical household appliances have the largest sale in Australia, especially in such items as vacuum cleaners and radiators. British electric fans and washing machines offer strong competition to the American product, however. During the fiscal year 1924-25 the report reveals Australia's total imports of electrical household appliances were valued at 1,137,000 pounds sterling, of which United States manufactures accounted for more than 425,000 pounds.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Line Construction Economically Accomplished

Low Cost of \$1,495 per Mile of 44-kv. Transmission Line  
Obtained Through Modern Production Methods

By GEORGE BRANNON, Assistant Superintendent of Distribution, Public Service Company of Colorado, Denver

Construction of 63.6 miles of 44-kv. transmission line and two substations in 82 working days, with an average of 40 and a short time maximum of 95 men on the job, has been accomplished by the Public Service Company of Colorado. Total cost of the transmission line amounted to \$1,495 per mile. The substation work involved included the enlargement of the Alamosa substation and the construction of a new 1,200-kva. substation at the distributing end of the line. Forethought in the arrangement and in the application of what may be called modern production methods is credited with the success of the job.

The low labor cost of \$116.48 per mile of poles set and ready for wire stringing, or \$173.70 per mile of completed line, was obtained by the simple expedient of using ordinary unskilled laborers for the common jobs incident to the construction of the line. The skilled line crews were kept off of the job except for the actual stringing of the conductors.

All holes were hand-dug. Digging crews were spread out over a 2-mile length of the line. As fast as a crew finished in one location it was carried forward to the head of the line to begin another hole. All crossarms, hardware and insulators were placed in position ready to receive the line wires before the poles were raised from the ground. Poles were handled and raised by means of a boom-and-winch hoist mounted on a truck and taking its power from the engine of the truck.

While construction methods were simplified as to personnel and equip-

ment the construction problems imposed by topographic and geologic conditions were by no means so simple. The first 42 miles of the line passed through country having underlying water strata within two feet or so of the surface of the ground. To permit holes to be dug under these conditions

even this expedient failed to keep the pole hole clear, the soil being so liquid in character that it flowed up from the bottom inside of the barrel filling the same before the pole-setting crew could get on the job. This necessitated a double excavation. To provide something of an indication of what was to be expected as the digging crew progressed across this part of the country, a test man preceded the hole-digging crews sampling the soil with a test auger. Thus fortified with advance information the foreman was able to plan his work according to the conditions to be met and to do this in advance.

The last six miles of the right-of-way traversed low mountainous country where it was necessary to blast for every pole hole. Several stretches of the line crossed ground so swampy with actual surface water that A-frame construction was resorted to in order to provide those sections of the line with sufficient transverse wind resistance.

Material and supplies were concentrated at and distributed from three main division stations. Work was carried on progressively from one end of the line to the other. The general organization of construction crews was as follows: A crew on material distribution; others on hole digging; framing and gaining; setting, lining and back filling; conductor stringing; and the final crew following up numbering and dating the poles and doing any final cleanup work necessary.

Wire stringing was accomplished with two line crews. The first crew proceeded with the distribution of the conductors from a reel cart, also removed such obstructions as fences, telephone lines, etc. This crew carried the conductors to the pole tops and in general prepared for the second crew which followed up doing the tie-in work and finishing the line. The second

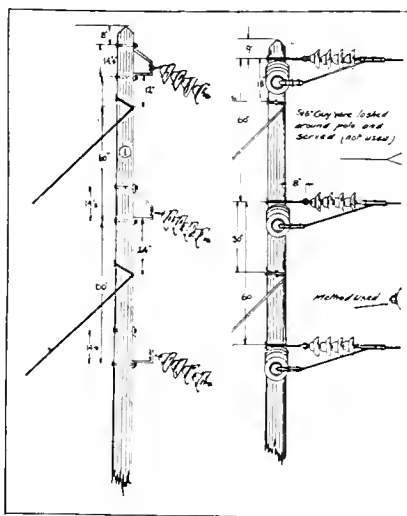


Fig. 1. Details of angle construction (left) for angles of from 105 to 165 deg., and (right) for 90-deg. angles.

it was necessary to use steel barrels as cofferdams, sinking the same as the mud and water were excavated from inside. Of course the two heads of each barrel had been removed. Under some of the more trying soil conditions

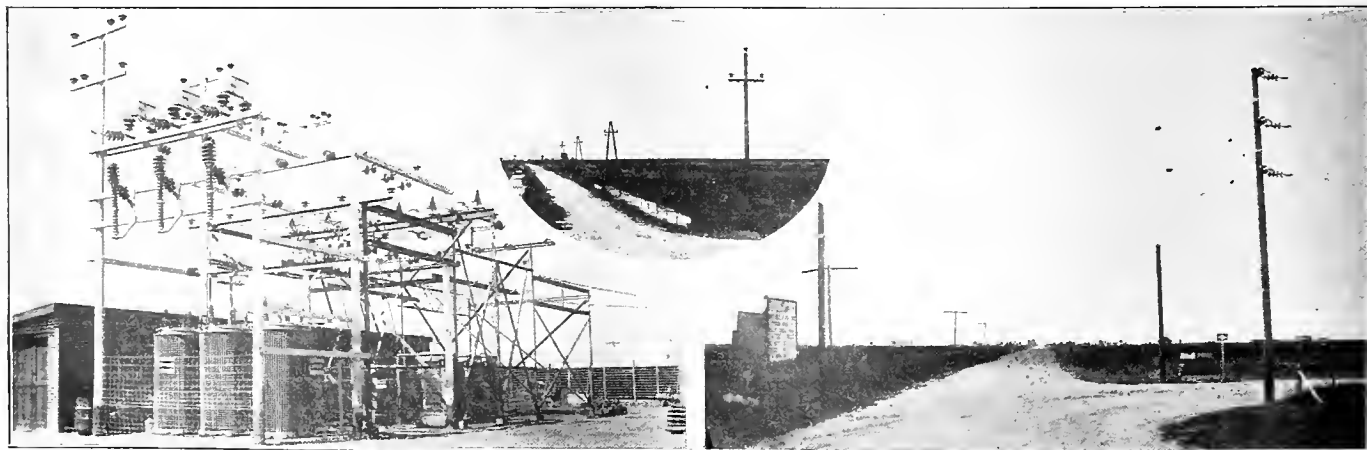


Fig. 2. Showing 44-kv. addition to Alamosa, Colo., substation of the Colorado Public Service Company (left) erected of wood poles for expediency. A typical right-angle corner is shown at the right. A-frame construction over marshy ground is shown in the insert.

crew also tightened up all bolts and other hardware that loosened due to shrinkage. Shrinkage occurred because initial erection took place when poles and in some cases crossarms were wet and somewhat green. The line was pulled to proper tension in lengths of about  $\frac{3}{4}$  mile per pull. Spans used in the line varied from 350 to 1,200 ft.

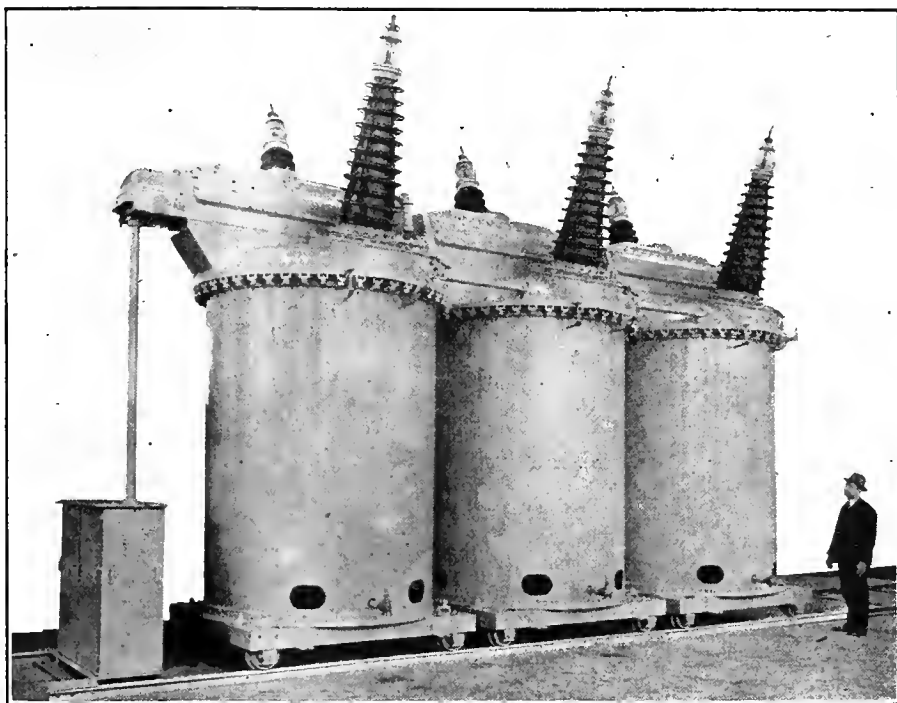
Spans over 400 ft. were carried on H-frame construction. Conductors used in the line were  $\frac{31}{64}$ -in. steel-reinforced aluminum cable. Pin-type insulators were used throughout except at angle positions and for certain long spans where suspension units were required. The number of linemen used for wire stringing averaged seven, with a short time peak of twelve, together with one foreman and using one two-ton line truck.

The reason for the sudden construction of this transmission line was the resumed activity in the Bonanza region of southern Colorado due to the proposed adoption of a cheaper ore reduction process. Mining optimists expect this new process to enable the operation of mines that have been closed for several years. At any rate the activity imposed upon the Public Service Company a sudden demand for 1,000 hp. of electrical energy or its equivalent and specifications called for this power to be available at a very early date. The Bonanza region formerly was served by a 16.5-kv. line from Salida, but the new requirements necessitated the construction of the above described 44-kv. line from Alamosa as the logical and economical step in supplying increased power to the Bonanza district. The history of the development of that part of the state of Colorado and the future possibilities of development of loads of various characters were considered before it was decided finally to construct the line as described.

### Simple Selective Indication for Grounded Feeders

By L. F. HUNT, Development Engineer, Southern California Edison Company, Los Angeles

Distribution voltages in many substations range from 6.6 to 16.5 kv. and are supplied in most cases from the delta-connected secondary of a transformer bank. Conditions of ground



The truck-mounting of oil circuit breakers by no means is limited to those of small sizes as the above 154-kv., 400-amp., G.E. breaker on the Tallahassee Power Company's system demonstrates. The tanks are 84 in. in diameter, the height to the tops of the bushings is 17 ft. and the weight per unit 17,000 lb.

faults on any of the lines radiating from a station bus may be indicated on the ground detector (see article on ground detectors by author in *Journal of Electricity*, April 1, 1926, p. 262, and April 15, p. 298.) Usually the feeder in trouble can be located only by dropping feeders one after the other from the bus until, when the feeder in trouble is dropped, the detector will indicate clear. The indicator system herein described permits the operator to investigate the location of a ground fault, when one shows up, without interruption to service.

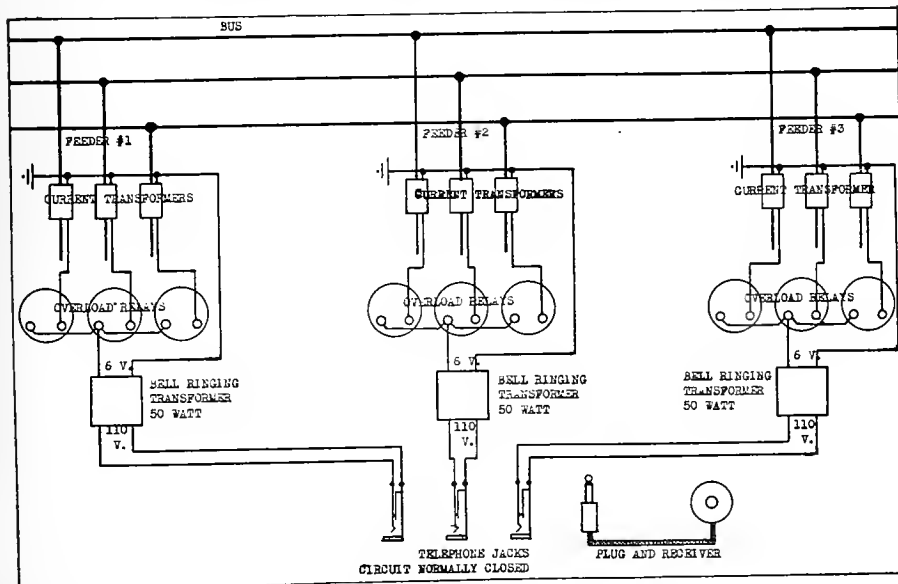
Where three current transformers are installed on the circuit for relays this simple means of audible signal may be arranged by connecting the 6-volt winding of a 50-watt bell-ringing transformer in the neutral return of

the current transformers. The 110-volt winding then is connected to a single-circuit jack as indicated in the accompanying illustration. This jack, contacts normally closed, is placed in a suitable and accessible position for the convenience of the station operator.

When a ground occurs, as indicated by the ground detector, the circuit in trouble may be located by plugging the telephone receiver from jack to jack until a sound is found. This sound is caused by the ground current which sets up a pronounced third harmonic current. This condition exists only on the particular feeder in trouble and thus as soon as the sound is located with the receiver, by shifting it from jack to jack on the different circuits, the feeder is definitely designated and may be treated as necessary. This scheme eliminates the necessity of the old method of dropping feeders until the faulty one is located.

If a visual indication is desired rather than a sound indication comparable readings can be taken with a vacuum-tube voltmeter used in place of the telephone receivers. With this set-up the grounded feeder would be indicated as that giving the highest meter reading.

The wiring diagram shows a representative installation covering three circuits. The system may be extended over as many circuits as may be desired. Ordinarily Western Electric jacks may be used. The bell-ringing transformer should be of at least 50-watt size so as to have the necessary current-carrying capacity to permit its insertion into the current transformer neutral. With the high-voltage winding of the bell transformer short-circuited, as it is normally, its low-voltage winding offers very little impedance in the neutral circuit. Therefore the effect upon relay operation is entirely negligible.



Typical application of grounded-feeder indicator.

## Concrete Trolley Arches for Eastern Electrification

A novel feature in the electrification program of the Detroit, Toledo & Iron-ton Railroad is the use of reinforced concrete trolley arches. These arches are being manufactured by the company and are given a 24-hr. initial set period, a 24-hr. curing treatment under steam at from 90 to 130 deg., a 24-hr. drying period at the same temperature, and finally an 18-day outdoor seasoning period.

Each arch complete, exclusive of its foundation, contains about 7 cu.yd. of concrete and weighs something over 15 tons. It is considered that with this type of towers the maintenance will be negligible and that they will last a lifetime.

## Action of Series-Connected Current Transformers

By E. C. GOODALE, Southern California Edison Company, Los Angeles

Metering installations often are incorrect, due either to a wrong initial connection or to a subsequent error incident to the loosening or breaking of one or more of the secondary leads. The particular instances to be considered in the following discussion are

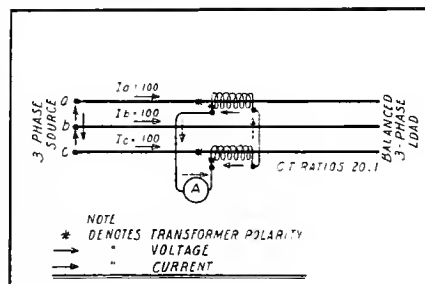


Figure 1

those on which the secondaries of the current transformers are connected in series, either initially or subsequent to installation.

Before considering the resultant action on meters involved in such connections it is advisable first to consider the action of the current transformers themselves. In 1925 a series of tests was made by the author on instrument transformers with secondaries connected in various series and parallel combinations. The parallel tests only proved what might have been predicted through a vector-analytical study.

Since series connections of current transformers are not in good standing in the engineering field and are met with only when errors in connections occur, the series tests are of particular interest. The tests were made in the meter-testing laboratory of the Syracuse Lighting Company of Syracuse, N. Y. The current transformers used were G.E. type W of 100/5 ratio. The quantitative value and phase relation of each voltage and current involved were determined and the following general law derived:

When the secondaries of current transformers are connected in series the resultant current actually flowing in the secondary circuit will be the vector-average of the currents flowing through the primaries divided by the turn ratio in each case.

This assumes current transformers of like design and equal ratio in each case. It held true except for the case where the three transformers on the three legs of a 3-phase circuit had their secondaries all connected in series. Harmonic currents then were present in such large quantities that the true vector relations of the actual (fundamental) secondary current could

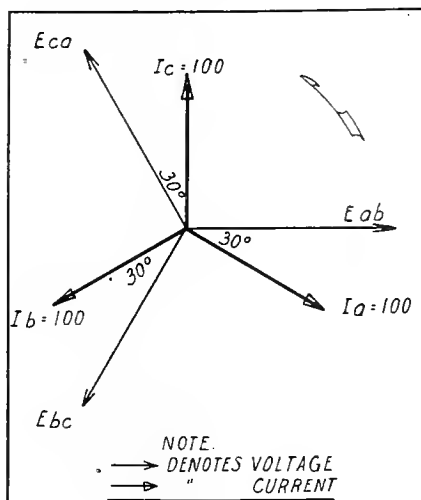


Figure 2

not be obtained with the apparatus at hand for the tests. When only two secondaries were connected in series, the third being shunted, the harmonic currents resulting were negligible and the results followed the above-stated law very closely.

The law might be restated somewhat more specifically thus:

If the secondaries of two current transformers of like ratio and design be connected in series, boosting, the actual current which will flow will be half the vector-sum of the currents flowing in their primaries, divided by the turn ratio. If connected bucking the actual current will be half the vector-difference, divided by the turn ratio.

In each case the vector-difference between what "ought to flow" and what actually flows in each secondary goes to magnetize the core of that transformer. This produces a correspondingly large voltage across both primary and secondary, similar to the action occurring when the secondary of a current transformer is opened.

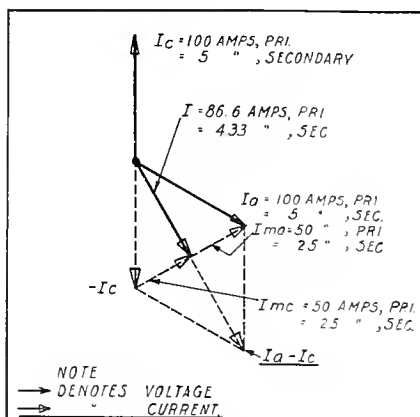


Figure 3

As an example, consider the case of two current transformers on a 3-phase, 3-wire circuit with secondaries in series and bucking shown in Fig. 1. Phase relations involved are shown in Fig. 2 for the condition of unity power factor and balanced load. The derivation of the value of the current actually flowing is shown in Fig. 3.

In Fig. 3 the current I is assumed to be flowing in the direction indicated by the dotted arrows, Fig. 1, and is equal to  $\frac{1}{2}(I_a - I_c)$  vectorially, that is, the actual current will be the vector-average-difference of  $I_a$  and  $I_c$ . The vector difference between this actual current, I, and current  $I_a$ , divided by the turn ratio will be the magnitude and vectorial position, or phase relation of the magnetizing current in phase A current transformer. The difference between  $-I$  and  $I_c$  will be the magnetizing current in phase C transformer.

To apply this principle to a metering problem take, as an example, the common case of the 2-element watt-hour meter used for power measurement on a 3-phase, 3-wire circuit. See Figs. 3 and 4. For the case of unity power factor and balanced load the true power consumed will be  $1.732 \times 10,000 \times 100 \times 1 = 1,732$  kw. The metered power

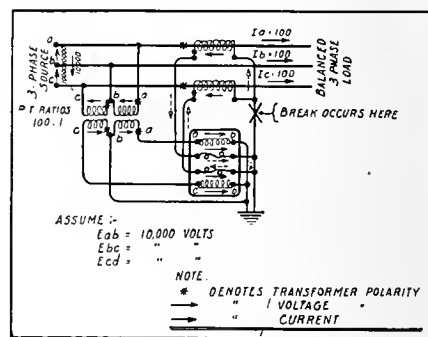


Figure 4

will be the sum of the power registered in the two elements, or:

Metered power,

$$A = E_{ab} \times I_a \times \cos 30^\circ, \\ = 10,000 \times 100 \times 0.866 = 866 \text{ kw.}$$

Metered power,

$$B = E_{cb} \times I_c \times \cos 30^\circ \\ = 10,000 \times 100 \times 0.866 = 866 \text{ kw.}$$

$$\text{Total} \quad 1,732 \text{ kw.}$$

However, suppose that the common negative in the current circuit is broken at X, Fig. 4. Then a plain series circuit will result, just as is shown in Fig. 1. Assuming the current to flow as indicated by the dotted arrows, Fig. 4, it will flow in opposite directions in the two elements of the meter. The current value will be  $\frac{1}{2}(I_a - I_c) = 4.33$  amp., as shown in Fig. 3. This corresponds to a primary current of 86.6 amp.

This 86.6-amp. current reacting with voltage  $E_{ab}$  at an angle of 60 deg., as shown in Fig. 6, will give a registration in meter element A of  $10,000 \times 86.6 \times 0.5 = 433$  kw. This same current passing in a reverse direction through element C, reacting with voltage  $E_{cb}$  at an angle of 120 deg., will be equivalent to a "positive" reaction at 60 deg. Thus the meter indication here, too, will be 433 kw. Therefore the



sum-total indication of the meter will be 833 kw. or 50 per cent of the actual power passing. This percentage always will hold good for this condition. Corresponding vector diagrams for other power factors will produce similar results.

The term "in series" as used in the foregoing discussion is limited strictly

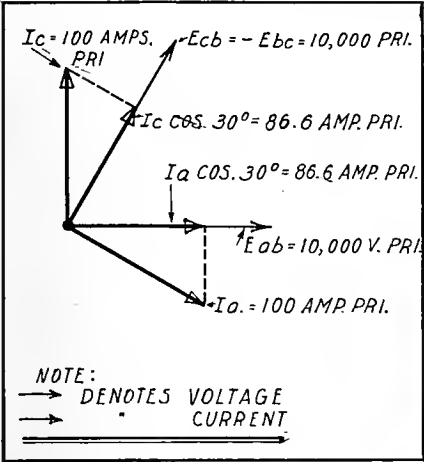


Figure 5

to mean only those cases wherein the secondary current from one transformer is forced to go through the secondary winding of another current transformer, with no intervening taps. Taps such as those used for relay actuation will change the conditions. This discussion is given as an analysis of the problem existing when such connections have been made in error or resulted from accident, and not as a recommendation for the use of a series connection. Such connections are understood universally to be harmful to the current transformers and dangerous to the meter tester.

The law developed already has been used as indicated in determining just how much power has been delivered to

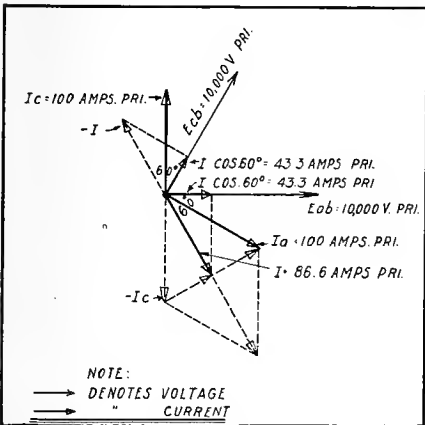


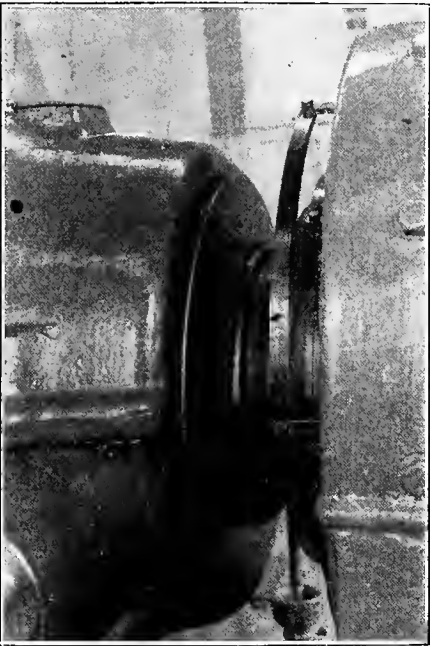
Figure 6

a customer during a period of operation under such connections. Knowing the meter registration and the period of time of operation, the correct figure of power passing the metering point may be determined accurately. The only error entering will be that incident to the voltage drop across the current transformer primaries, and which will be against the consumer in most normal installations, but practically negligible in magnitude.

### Bearing Oil Creepage Stopped by Use of Felt Ring

Oil creeping out along the shafts of rotating machinery is always a source of more or less difficulty, particularly where excitors are mounted on the end of the main shaft. An easily applied method of effectively stopping such undesirable oil flow is shown in the accompanying illustration.

A ring of heavy felt fitted snugly around the shaft as shown serves to wipe off the creeping oil and to cause it to drain back into the bearing reservoir. The felt is held in place by means of a two-piece metal ring of about 3/16-in. thickness fastened to the bearing housing with flat-headed machine screws. The metal ring is just enough larger than the shaft to permit the passage of the felt between



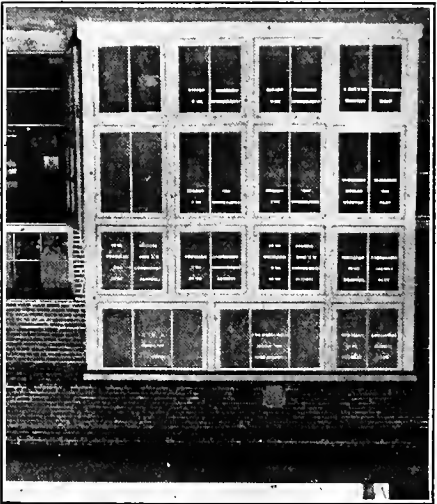
Felt ring around the shaft of a synchronous condenser to prevent oil-throwing.

and to hold the felt tightly against the shaft. This is a simple, effective and economical way of effecting a cure for this evil. The installation pictured is on a 12,500-kva. synchronous condenser at the Newark substation of the Pacific Gas and Electric Company.

### Lifting Magnets Immersed in Acid Pickling Bath

The reduction of labor requirements from thirty-man-hours to two-man-hours for a given batch of material was accomplished by the Colonial Steel Company at its Colona, Pa., plant.

This company manufactures high-grade tool steel and steel for other special purposes. As these products must be particularly free from defects, the seams, dirt inclusions and other similar defects which usually show up on the outer surface of billets after they are rolled from ingots must be chipped out before rolling them to finished sizes. To facilitate the necessary inspection, all of the billets and bars are placed first in a pickling bath to remove the outside scale and dirt. After this has been accomplished it is easy to detect the flaws and chip them out with air chipping hammers. This



Outdoor switch cells at the compressor station of the San Diego Consolidated Gas & Electric Company. Remote control is provided from the compressor room thus insuring maximum safety. The plant has been expanded to a total capacity of 2,600 hp.

process naturally results in a finer grade steel. It is in this pickling department that the aforementioned reduction in labor cost has been made. Formerly all of the metal bars had to be stacked into the acid tubs by hand and required six men working together five hours to fill one tub. By placing two standard E. C. & M. rectangular lifting magnets together end to end to form one continuous magnet 52 in. long, a magnetic lifting unit was formed which just fitted the acid tubs. The electrical circuits of the two magnets were connected together to form a common unit and led to a common controller.

By the use of this magnet it is possible to lay one complete layer of billets or bars into the acid tubs at one operation. This is much faster than the old hand-method, and the job of loading one of these acid tubs now takes two men but one hour.

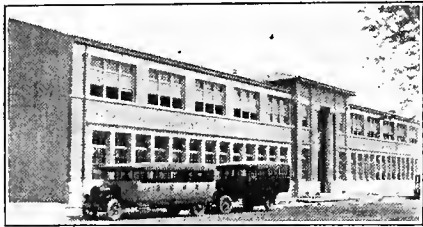
One of the interesting features of this application is the fact that it is necessary for this lifting magnet to be immersed in the acid in order to place and remove the billets and bars from the pickling bath. Furthermore, when the bars are lifted from the bath a high-pressure spray of water is directed over the bars and magnet to remove traces of acid and debris. This would seem to be rather severe service for an electrical device, but service has been entirely satisfactory during the long period of operation of this apparatus.

Digestion can be stimulated, say those purported to know, by placing an electric light on the abdomen after eating. Light from an ordinary incandescent lamp, it seems, has a germicidal effect and will relieve pain. This is a discovery of social prominence and consequence. Soon we may expect the well appointed table to include a convenience outlet at each place. Gentlemen after dinner will carry lights amidships to indicate that they have dined.<sup>1</sup> —H.U.

# IDEAS FOR THE CONTRACTOR

## Kern High School Shop Well Equipped Electrically

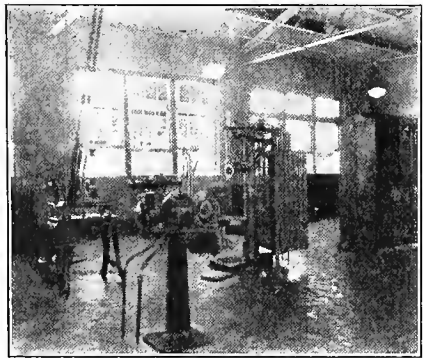
More than usual in its completeness in individual motor drive shop equipment is the recently completed Kern County Union High School shop building in Bakersfield, Calif. Every one of the 32 machines in the shop is individu-



The Kern Union High School, Bakersfield, Calif., in whose shop building modern electric equipment is used to advantage.

ally driven by a direct-connected motor.

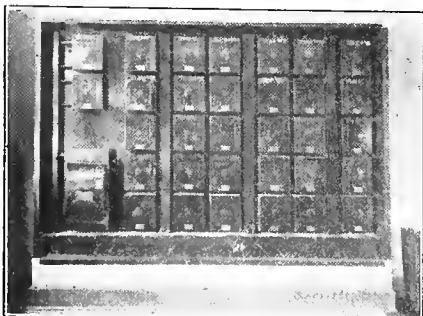
Each of the 32 motor-driven machines in the shop is individually controlled by a G.E. CR-7006-D-4 magnetic switch control. Control buttons



Each machine has its individual motor drive in the machine shop.

are located at convenient places on each machine.

In each case the source of energy is brought to the machine through the pull box extended through the concrete



The shop switchboard, with individual remote control for each machine.

floor from the ceiling below. In making the connections to the machines through the floor, nipples were used. In supporting the conduit and fixtures

## At the Other Fellow's Price

(Something worth reading, taken from the bulletin of the California Electragists, Southern Division.)

Continued interest in the possibilities of the house wiring field is suggested from many sources as timely and beneficial. Present indication leads to the conclusion that much good house wiring business is being passed up by Southern California Electragists "because house wiring is unprofitable AT THE OTHER FELLOW'S PRICE." Obviously this is true. Superior ability for handling the customer's work combined with a new constructive selling effort produces a different result. The average Electragist will profit if he goes after house wiring business intelligently right now.

The contractor who is working consistently to establish a reputation for high class work is sure to prosper in the long run. House wiring is no exception among the specialties and presents a tremendous and continuous potential market. The Red Seal Plan offers your best tangible means for augmenting your own effort and ability on house wiring sales. Those most successful in Red Seal sales advise us that emphasis on the idea of complete and modern electrical service for the home, with no more than NECESSARY reference to the wiring job itself, produces the quickest and most substantial results. Forget that you are selling an electrical installation, rather directing your prospect's attention to the living conveniences your installation will provide for him.

on 10-ft. centers conduit was brought in through the concrete roof. This was installed during the course of construction of the building.

The switchboard arrangement consists of flat copper bus bars extending the full length of the board with the switches bolted into the copper bus. The switchboard cabinet was made of No. 12 gage iron. Circle T switches were used.

The main-line switch is for 600 amp., 250 volts; the lighting switch, 400 amp. and the power switch, 400 amp. The

board itself is 12 in. x 6 ft. high x 8 ft. long. A 4-in. conduit service containing three 900,000 circ.mil cables is used to feed the power. Three 750,000 circ.mil cables are used for the lighting. The board was designed and manufactured by the Star Electric Company of Bakersfield.

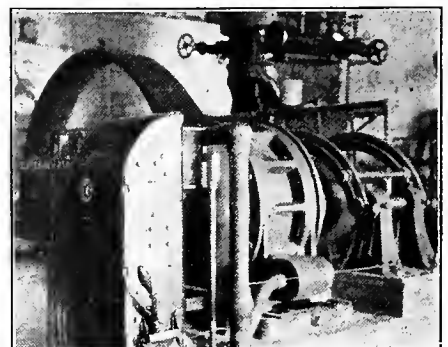


Main switchboard for the Kern Union High school, located in the basement.

## Motor Drive Substituted for Shaft Drive in Ice Plant

The advantage of electric drive over steam in an ice and cold-storage plant was demonstrated recently in the instance of the San Luis Ice & Cold Storage Company of San Luis Obispo, Calif. Cline's Electric Shop was responsible for the changeover to electric drive which brought the plant up from 2 electric motors to 14, with a total load of 100 hp. and a capacity of 150 hp.

The plant formerly was operated by means of shaft drive. Mr. Cline re-

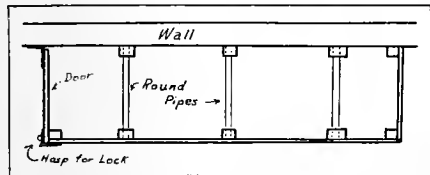


Method employed by contractor to connect motor and control on substitution of electric motor for shaft drive in ice plant.

wired and changed it to individual motor drive. The service to each motor is 500,000 circ.mil cable in 4-in. conduit. New main and sub-distribution boards were installed. The method of connection is shown in the accompanying photograph.

Lock Conduit Rack May be Made Simply with Pipe and Wood

A simple though very effective conduit rack may be made with little effort and provided with means of locking the conduit in the rack.



Simple plan for construction of lockable conduit rack from wood and pipe.

ing the conduit in the rack. The accompanying drawing shows the general plan, and the photograph the result.

This particular rack was made so that it could be filled from the end and located in the storeroom in such position that a truck might back up to the open end. The rack can be locked, the stockman given charge of the key and conduit cannot be removed without unlocking it.

The smaller sizes of conduit would

ordinarily be stored in the top section, large sizes being graded in the lower racks. The floor portion can be used for short pieces or metal moulding.



Lock conduit rack completed. Conduit is removable only from the locked end. Small pieces or metal moulding can be stored in bottom section.

The mean pressure of the atmosphere usually is estimated at 14.7 lb. per sq.in., so that with a perfect vacuum it will sustain a column of mercury 30 in., or of water 34 ft., but it is not a good practice to operate centrifugal pumps over 18 or 20 in. vacuum for altitudes of 2,500 ft. or under, or 10 to 12 in. vacuum for altitudes of 5,000 ft. or under.

Head: Distance from level of liquid at intake, on a vertical line, to the level of liquid at discharge.

Friction Head: Friction in pipes and pump.

Gal. per Min.: Gallons per minute.

Miner's Inch: Amount of water which will flow through an opening 1 in. square in a plank 2 in. thick, under a head of 4 in. above the upper edge of the opening.

Miner's Inch=11.2 gal. per min. (California and Arizona).

Miner's Inch=9.0 gal. per min. (Utah, Idaho, Montana, Nevada, New Mexico, Oregon, Washington.)

Miner's Inch=11.7 gal. per min. (Colorado).

1 cu.ft. per second=449 gal. per min.

1,000 lbs. per hour=2 gal. per min.

1 acre-ft.=326,000 gallons.

1 lb.ft.=12 gal.

1 atmosphere=34 ft. head.

1 in. of mercury=1.134 ft. head.

1 cu.in.=.0361 lb.

27.7 cu.in.=1 lb. weight.

1 c.ft.=62.4245 lb.@39 deg. F.

1 cu.ft.=62.4245 lb.@39 deg. F.

1 U.S. gal.=8.33111 lb. (distilled).

1 U.S. gal.=8.34 (ordinary practice).

1 U.S. gal.=231 cu. in.

1 imperial gal.=10 lb.@62 deg. F.

1 lb. pressure=2.31 ft. in height.

1 ft. height=.433 lb.

To convert any of the above to the Imperial standard multiply by the factor 1.2.

The mean pressure of the atmosphere at sea level is estimated at 14.7 lb. per sq.in.

To find the pressure in pounds per sq.in. of a column of water, multiply the height in feet by 1.433. Approximately every foot elevation equals one-half lb. pressure per sq.in. allowing for ordinary friction.

Doubling the diameter of a pipe increases its capacity four times.

Friction of liquids in pipe increases as the square of the velocity.

Making allowance for evaporation it requires 28,320 gallons of water to irrigate 1 acre 1 in. deep.

It requires from 10 to 20 in. of water per acre to produce a crop by irrigation, the average being 16 in. The actual amount required depends upon the crop and the season.

Flooding alfalfa 6 in. deep will wet the soil 4 ft. from the surface. Flooding orchards 4 in. deep will wet the soil 4 ft. from the surface.

The power required for pumping depends upon the weight of the liquid to be pumped per minute and the vertical height from intake to outlet. To this must be added the allowance for friction.

Wt. of liquid X ht. in ft.  
Theoretical horsepower=—————  
33,000

Actual horsepower: H.P. =  $\frac{W \times H}{33,000 \times E}$

W = Wt. of liquid.  
H = Total head including friction.  
E = Efficiency of pump.

Example

To pump water 500 gal. per min. against 50 ft. combined "hs" and "hd," pipe line 4 in. in diameter, 200 ft. long, with three 90-deg. elbows, and a pump efficiency of 65 per cent.

From Table I we get:

Friction loss for 100 gal. 4-in. pipe discharging 500 gal. per min.=17.2. For 200 ft. =2 X 17.2=34.4 ft.

Electrical Estimating for the Contractor—XVII  
Further Consideration of Pump Characteristics, with  
Tables Facilitating Estimating Load

By J. R. WILSON\*, Quality Electric Works, Los Angeles

The pipe which is placed below the pump is known as the suction pipe and the pipe placed above the pump is known as the discharge pipe. The suction pipe is designated "hs" and the discharge pipe is designated "hd." The total head equals "hs" plus "hd" plus the friction in the pipe from inlet to outlet. The work of the pump consists in lifting the water or other substance the distance of "hs" by the difference of pressure at the suction inlet of the pump and the higher pressure on the surface of the water outside. The outside pressure is usually "one atmosphere" (equal to 34 ft.) therefore the highest theoretical-suction lift will be 34 ft. (at sea level) less pipe friction and the pressure required to cause the water to flow up the suction pipe. This is known as the "velocity head."

Important Considerations

If the water to be lifted is hot, other factors must also be considered. Water at high temperature will turn into steam at a pressure below that at which it will remain in a state of water. Hot water cannot be lifted very high and very hot water cannot be lifted at all. This is so because a low pressure at the runner inlet (necessary to lift the water) would convert the water into steam at that point. Because of this, boiler feed pumps are placed so that the water flows to the pumps under pressure. Whenever it is necessary to pump hot

water, the pump manufacturer should be consulted.

The performance of a centrifugal pump is dependent upon the design of the pump runner. If the speed of the pump is changed the capacity will be changed in direct proportion to the speed change. Also the head will change in direct proportion to the square of the speed and the horsepower in direct proportion to the cube of the speed. For the aforementioned reasons it is necessary to run the pump at the correct speed if a certain desired capacity is to be obtained. In applying motors to pumps great care should be taken to specify the cycles of the current supply. Reference to Table XI will serve to make this point clearer. As will be noted there is a difference of approximately 16 per cent between 50 and 60 cycle speeds. With belt-driven installations this difference sometimes can be overcome by proper selection of pulley sizes.

Terms and Definitions

For the benefit of those estimators who have not had an extended experience with the data, rules and phraseology pertaining to water and pumping equipment a number of these are given herewith:

One million U.S. gallons in 24 hours—to the following:

	24 Hours
Gallons .....	1,000,000
Cubic feet .....	133,689
Cubic inches.....	231,000,000
Pounds .....	8,340,000

	1 Hour	1 Minute	1 Second
Gallons .....	41,666.66	694.44	11.574
Cubic feet .....	5,570	92.833	1.574
Cubic inches.....	9,624,960	160,416	2,673.6
Pounds .....	347,498	4,791.63	96.527

\* All rights reserved by the author.

From Table II we get:

Friction loss in one 4-in. 90-deg. elbow, discharging 500 gal. per min. = 2.47, three elbows =  $3 \times 2.47 = 7.4$  ft.

Total head =  $50 + 34.4 + 7.4 = 91.8$  ft.

Water weighs 8.33 lb. per U.S. gal. Weight pumped per min. will be  $8.33 \times 500 = 4,165$  lb.

Formula:

$$4,165 \times 91.8 = 17.8 \text{ hp.}$$

$$\text{Hp.} = \frac{33,000 \times .65}{17.8}$$

### Direct Flow Turbine Type

Another type of deep-well pump which has proved of very high efficiency is the direct-flow turbine type. Among the claims made for this type

of pump the following should prove of interest:

1. Large capacity with small diameter well.
2. Impellers so placed as to reduce internal pressure to less than 3 lb. in any part.
3. Water raised in straight upward line with no angles to retard flow.
4. Permits extensions to be made (should water bearing level recede) without affecting speed, capacity, or efficiency.
5. Minimum effect from gassy wells, there being no pockets to cause air lock.

A very large number of these pumps is in successful operation in deep well districts of the western states, and investigation of their merits will well repay the effort.

Where large quantities of water are to be pumped against varying heads (with heads of from zero to 8 or 10 ft.) the problem has presented considerable difficulty. Where the head is absolutely unchanging, the use of a scroop wheel has proved very efficient, but where the head varies over a foot or two above or below the rating for which the wheel is designed the efficiency of the wheel falls to zero. Again, the use of a centrifugal pump on a head of only 2 or 3 ft. is impractical because the efficiency may fall to as low as 20 to 30 per cent, especially so if the head be varying.

TABLE III

Note—This table is based upon a mechanical efficiency of 100 per cent for the pumping unit. To get the actual horsepower required, divide the result obtained from the table by the efficiency of the pumping unit expressed as a decimal.

Where the pressure in pounds per square inch against which the pump has to operate is given instead of the head in feet it can be converted into head by multiplying by 2.31 as each pound per square inch of pressure is equal to the pressure of a head of water 2.31 feet.

\*Table of Theoretical Horsepower required to raise Water to different Heights.

GAL. PER MIN.	FEET HEAD															
	5	10	15	20	25	30	35	40	45	50	60	70	80	90	100	125
5	.008	.012	.016	.020	.025	.031	.037	.044	.050	.056	.063	.070	.077	.084	.091	.108
10	.012	.025	.037	.050	.062	.075	.087	.100	.112	.125	.137	.150	.163	.175	.188	.225
15	.015	.031	.047	.062	.077	.091	.106	.121	.137	.150	.163	.175	.188	.200	.213	.250
20	.018	.037	.056	.075	.094	.112	.131	.150	.169	.188	.207	.226	.245	.264	.283	.333
25	.021	.042	.063	.084	.105	.126	.147	.168	.189	.210	.231	.252	.273	.294	.315	.375
30	.024	.048	.072	.096	.120	.144	.168	.192	.216	.240	.264	.288	.312	.336	.360	.420
35	.027	.054	.081	.108	.135	.162	.189	.216	.243	.270	.297	.324	.351	.378	.405	.480
40	.030	.060	.090	.120	.150	.180	.210	.240	.270	.300	.330	.360	.390	.420	.450	.540
45	.033	.066	.099	.132	.165	.198	.231	.264	.297	.330	.363	.396	.429	.462	.495	.594
50	.036	.072	.108	.144	.180	.216	.252	.288	.324	.360	.396	.432	.468	.504	.540	.648
60	.042	.084	.126	.168	.210	.252	.294	.336	.378	.420	.462	.504	.546	.588	.630	.756
70	.048	.096	.144	.192	.240	.288	.336	.384	.432	.480	.528	.576	.624	.672	.720	.864
80	.054	.108	.162	.216	.270	.324	.378	.432	.486	.540	.594	.648	.702	.756	.810	.972
90	.060	.120	.180	.240	.300	.360	.420	.480	.540	.600	.660	.720	.780	.840	.900	.1080
100	.066	.132	.198	.264	.330	.396	.462	.528	.594	.660	.726	.792	.858	.924	.990	.1188
125	.078	.156	.234	.312	.390	.468	.546	.624	.702	.780	.858	.936	.1014	.1092	.1170	.1404
150	.090	.180	.270	.360	.450	.540	.630	.720	.810	.900	.990	.1080	.1170	.1260	.1350	.1620
175	.102	.204	.306	.408	.510	.612	.714	.816	.918	.1020	.1122	.1224	.1326	.1428	.1530	.1836
200	.114	.228	.342	.456	.570	.684	.798	.912	.1026	.1140	.1254	.1368	.1482	.1596	.1710	.2052
250	.138	.276	.414	.552	.690	.828	.966	.1104	.1242	.1380	.1518	.1656	.1794	.1932	.2070	.2508
300	.162	.324	.486	.648	.810	.972	.1134	.1296	.1458	.1620	.1782	.1944	.2106	.2268	.2430	.2952
350	.186	.372	.558	.744	.930	.1116	.1302	.1488	.1674	.1860	.2046	.2232	.2418	.2604	.2790	.3408
400	.210	.420	.630	.840	.1050	.1260	.1470	.1680	.1890	.2100	.2310	.2520	.2730	.2940	.3150	.3840
450	.234	.468	.696	.924	.1152	.1384	.1616	.1848	.2080	.2312	.2544	.2776	.3008	.3240	.3472	.4224
500	.258	.516	.774	.1032	.1296	.1560	.1824	.2088	.2352	.2616	.2880	.3144	.3408	.3672	.3936	.4776
550	.282	.564	.846	.1136	.1416	.1696	.1976	.2256	.2536	.2816	.3096	.3376	.3656	.3936	.4216	.5136
600	.306	.612	.918	.1240	.1536	.1832	.2128	.2424	.2720	.3016	.3312	.3608	.3904	.4200	.4496	.5472
650	.330	.660	.990	.1344	.1656	.1968	.2280	.2592	.2904	.3216	.3528	.3840	.4152	.4464	.4776	.5808
700	.354	.708	.1062	.1448	.1776	.2104	.2432	.2760	.3088	.3416	.3744	.4072	.4400	.4728	.5056	.6144
750	.378	.756	.1122	.1536	.1872	.2208	.2544	.2880	.3216	.3552	.3888	.4224	.4560	.4896	.5232	.6336
800	.402	.804	.1182	.1608	.1956	.2304	.2652	.2996	.3344	.3688	.4032	.4376	.4720	.5064	.5408	.6528
850	.426	.852	.1242	.1672	.2032	.2384	.2736	.3088	.3440	.3792	.4144	.4496	.4848	.5200	.5552	.6696
900	.450	.900	.1302	.1732	.2100	.2452	.2804	.3156	.3508	.3860	.4212	.4564	.4916	.5268	.5620	.6784
950	.474	.948	.1362	.1800	.2172	.2524	.2876	.3228	.3580	.3932	.4284	.4636	.4988	.5340	.5692	.6872
1000	.498	.996	.1422	.1872	.2256	.2608	.2960	.3312	.3664	.4016	.4368	.4720	.5072	.5424	.5776	.6972

\*Allowance should be made for friction.

TABLE IV

Table converting inches vacuum into feet suction

Inch Vacuum	Feet	Inch Vacuum	Feet	Inch Vacuum	Feet	Inch Vacuum	Feet
1	1.13	6	6.80	12	13.61	22	24.98
1 1/4	1.10	6 1/4	7.37	13	14.74	23	26.06
2	2.27	7	7.94	14	15.88	24	27.22
2 1/4	2.84	7 1/4	8.50	15	17.01	25	28.35
3	3.41	8	9.07	16	18.14	26	29.48
3 1/4	3.98	8 1/4	9.64	17	19.28	27	30.62
4	4.54	9	10.21	18	20.41	28	31.75
4 1/4	5.11	9 1/4	10.77	19	21.55	29	32.89
5	5.67	10	11.34	20	22.68	30	34.02
5 1/4	6.23	11	12.47	21	23.81		

TABLE VII

## IRRIGATION WATER QUANTITY TABLES

QUANTITY OF WATER REQUIRED TO COVER ONE ACRE TO DEPTH STATED			"SECOND FOOT," CHANGED TO GALLONS, ALSO "ACRE FEET" FOR GIVEN PERIODS OF TIME									GALLONS REQUIRED TO COVER GIVEN NUMBER OF ACRES TO A DEPTH OF ONE (1) FOOT		
Depth in Inches or Acre Inches	Cubic or Second Feet on One Acre	Gallons to Cover One Acre	Number of Second Feet	Gallons in One Minute's Flow	Gallons in One Hour's Flow	Gallons in Twelve Hours' Flow	Gallons in Twenty-four Hours' Flow	Acre Feet in One Hour's Flow	Acre Feet in Twelve Hours' Flow	Acre Feet in Twenty-four Hours' Flow	Number of Acres	Gallons to Cover One Inch Deep	Gallons to Cover One Foot Deep	
1	3630	27154	.25	112.2	6732.0	80790	161580	.0207	.2479	.4958	1	27154	325851	
2	7260	54309	.50	224.4	13464.0	161579	323158	.0413	.4959	.9918	2	54309	651703	
3	10890	81463	.75	336.6	20196.0	242369	484738	.0620	.7438	1.4876	3	81463	977554	
4	14520	108617	1.00	448.8	26928.0	323158	646316	.0826	.9917	1.9834	4	108617	1303406	
5	18150	135771	1.25	561.0	33660.0	403948	807896	.1033	1.2397	2.4794	5	135771	1629257	
6	21780	162926	1.50	673.2	40392.0	484738	969476	.1231	1.4876	2.9752	6	162926	1955108	
7	25410	190080	1.75	785.5	47130.0	565527	1131054	.1446	1.7355	3.4710	7	190080	2280960	
8	29040	217234	2.00	897.7	53862.0	646317	1292634	.1653	1.9835	3.9670	8	217234	2606812	
9	32670	244389	2.50	1222.1	67326.0	807896	1615792	.2066	2.4793	4.9586	9	244389	2932663	
10	36300	271542	3.00	1346.5	80790.0	969475	1938950	.2479	2.9752	5.9504	10	271542	3258515	
11	39930	298697	4.00	1795.3	107718.0	1292634	2585268	.3306	3.9669	7.9338	15	407314	4887772	
12	43560	325851	5.00	2244.2	134532.0	1615792	3231584	.4132	4.9586	9.9172	20	542669	6512096	
14	50820	380160	6.00	2693.0	161580.0	1938951	3877902	.4959	5.9503	11.9006	25	678857	8146285	
16	58080	434469	7.00	3141.8	188508.0	2262109	4524218	.5785	6.9421	13.8842	30	814629	9775544	
18	65340	488777	8.00	3590.6	215436.0	2585268	5170536	.6612	7.9338	15.8676	40	1086172	13034058	
20	72600	543086	9.00	4039.5	242370.0	2908426	5816852	.7438	8.9255	17.8510	60	1629257	19551087	
22	79860	597394	10.00	4488.3	269280.0	3231585	6463170	.8264	9.9173	19.8346	80	2172343	26068116	
24	87120	651703	20.00	8976.6	538596.0	6463170	12926340	1.6529	19.8345	39.6692	160	4344686	52136232	

The "Second Foot" is the constant flow of one cubic foot per second (exact 7.48052 gallons). The "Acre Foot" is the quantity of water required to cover one acre (12) inches deep.



TABLE VIII

Flow of Water in Concrete Pipes

Head in Feet per 1,000 Ft. of Pipe Line	8 Inch Pipe Running Full		10 Inch Pipe Running Full		12 Inch Pipe Running Full		14 Inch Pipe Running Full		16 Inch Pipe Running Full		20 Inch Pipe Running Full		24 Inch Pipe Running Full	
	Cubic Ft. per Second	Miner's Inches	Cubic Ft. per Second	Miner's Inches	Cubic Ft. per Second	Miner's Inches	Cubic Ft. per Second	Miner's Inches	Cubic Ft. per Second	Miner's Inches	Cubic Ft. per Second	Miner's Inches	Cubic Ft. per Second	Miner's Inches
.5..	.24	12.0	.44	22.4	.74	37.3	1.15	57.5	1.64	82.4	3.04	152.	5.01	250.
.6..	.26	13.2	.49	24.6	.82	41.0	1.26	63.0	1.81	90.5	3.44	172	5.51	275.
.7..	.28	14.2	.53	26.5	.88	44.2	1.30	65.4	1.95	97.5	3.60	180.	5.94	297.
.8..	.30	15.3	.56	28.4	.94	47.4	1.45	72.8	2.09	104.5	3.86	193.	6.36	318.
.9..	.32	16.2	.60	30.1	1.00	50.2	1.54	77.2	2.21	110.9	4.09	204.	6.74	337.
1.0..	.34	17.0	.63	31.7	1.05	52.9	1.62	81.4	2.45	122.5	4.32	216.	7.10	355.
1.5..	.41	20.9	.77	38.8	1.29	64.8	1.99	99.6	2.86	143.0	5.28	264.	8.70	435.
2.0..	.48	24.1	.90	45.0	1.49	74.7	2.30	115.0	3.30	165.0	6.10	305.	10.04	502.
3.0..	.59	29.5	1.10	55.0	1.83	91.5	2.81	140.6	4.04	202.0	7.46	373.	12.30	615.
4.0..	.68	34.1	1.27	63.5	2.11	105.9	3.25	162.5	4.67	233.5	8.62	431.	14.20	710.
5.0..	.76	38.2	1.42	71.0	2.36	118.0	3.63	181.5	5.21	260.5	9.64	482.	15.85	792.
6.0..	.83	41.8	1.55	77.8	2.59	129.5	3.99	199.7	5.72	286.0	10.58	529.	17.41	870.
7.0..	.90	45.2	1.68	84.0	2.80	140.0	4.30	215.0	6.18	309.0	11.40	570.	18.80	940.
8.0..	.96	48.3	1.79	89.9	3.00	150.0	4.61	230.5	6.61	330.5	12.40	620.	19.88	994.
9.0..	1.02	51.2	1.90	95.3	3.18	159.0	4.88	244.0	7.00	350.0	12.94	647.	21.30	1065.
10.0..	1.10	55.0	2.01	100.5	3.35	157.5	5.15	257.5	7.38	369.0	13.65	682.	22.46	1123.
12.0..	1.18	59.1	2.20	110.0	3.67	183.5	5.64	282.0	8.10	405.0	14.95	747.	24.60	1230.
14.0..	1.28	64.0	2.38	119.0	3.96	198.0	6.10	305.0	8.75	437.6	16.15	807.	26.60	1330.
16.0..	1.36	68.2	2.54	127.0	4.24	212.0	6.51	325.5	9.35	467.6	17.26	863.	28.40	1420.
18.0..	1.45	72.5	2.70	135.0	4.48	224.0	6.90	345.0	9.90	495.0	18.31	915.	30.20	1510.
20.0..	1.52	76.1	2.83	141.8	4.74	237.0	7.26	363.0	10.41	520.5	19.26	963.	31.70	1585.
22.0..	1.60	80.1	3.03	151.5	4.81	240.5	7.30	385.0	11.05	552.5	20.20	1010.	33.08	1684.
24.0..	1.68	84.0	3.20	161.0	5.07	253.5	8.14	407.0	11.69	584.6	21.26	1060.	35.58	1779.
26.0..	1.76	88.2	3.42	171.0	5.32	266.0	8.58	429.0	12.32	616.0	22.00	1110.	37.48	1874.
28.0..	1.85	92.5	3.62	181.0	5.58	279.0	9.20	451.0	12.97	648.6	23.20	1160.	39.38	1969.
30.0..	1.92	96.1	3.83	191.8	5.84	292.0	9.46	473.0	13.01	650.5	24.20	1210.	41.28	2064.

This problem was first solved successfully by A. B. Wood, chief engineer of the New Orleans Sewage and Water Board. Mr. Wood has perfected the design of a screw pump which works with maximum efficiency on a wide range of lifts. The basic design of this pump is a cylindrical casing containing a propellor discharging the water radially through the pump. There is a slight revolving motion imparted to the water as it passes

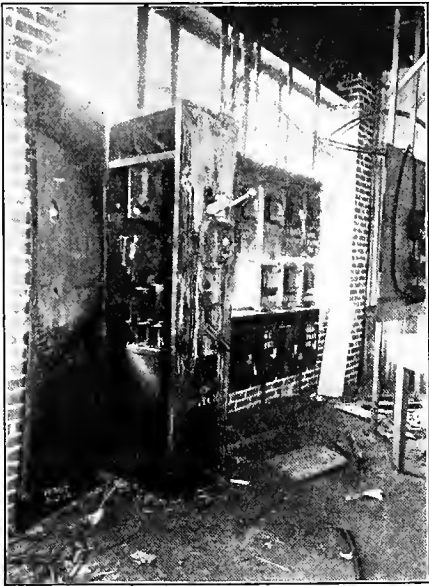
TABLE XI

Approximate Full Load R.P.M.

No. of Poles	60 Cycle	50 Cycle
4	1760	1450
6	1160	950
8	870	725
10	690	585
12	575	480
14	490	420
16	435	365

through the propellor, this motion being arrested by the use of stationary diffusion vanes, thus avoiding sudden change of velocity.

The inlet and outlet nozzles are about the same diameter and are of such proportions that the water is picked up at low velocity and discharged at about the same velocity. The operation of this pump is such that the horse power increases with the head and decreases as the pumping



This blow-up was the result of an "iron-clad" wiring job being neither properly nor sufficiently grounded outside the building. The breakdown occurred on the consumer's premises ahead of all fuses.

TABLE IX

Depth of Water on Crest			Discharge			Depth of Water on Crest			Discharge			Depth of Water on Crest			Discharge		
Inches	Cubic Feet Per Second	Gallons Per Minute	Inches	Cubic Feet Per Second	Gallons Per Minute	Inches	Cubic Feet Per Second	Gallons Per Minute	Inches	Cubic Feet Per Second	Gallons Per Minute	Inches	Cubic Feet Per Second	Gallons Per Minute	Inches	Cubic Feet Per Second	Gallons Per Minute
1	.08	36.0	3	.42	189.	5	.91	408.	6	1.26	567.	7	1.50	675.	8	1.75	787.
1 1/8	.10	45.0	3 1/8	.45	202.	5 1/8	.94	422.	6 1/8	1.34	603.	7 1/8	1.58	711.	8 1/8	1.83	823.
1 1/4	.11	49.5	3 1/4	.47	211.	5 1/4	.97	436.	6 1/4	1.42	638.	7 1/4	1.66	747.	8 1/4	1.91	864.
1 1/2	.13	58.5	3 1/2	.50	225.	5 1/2	1.01	455.	6 1/2	1.50	675.	7 1/2	1.75	787.	8 1/2	2.00	900.
1 3/4	.15	67.5	3 3/4	.53	238.	5 3/4	1.04	468.	6 3/4	1.58	711.	7 3/4	1.83	823.	8 3/4	2.08	940.
1 3/8	.17	76.5	3 3/8	.56	252.	5 3/8	1.08	486.	6 3/8	1.66	747.	7 3/8	1.91	864.	8 3/8	2.16	981.
1 3/16	.19	85.5	3 3/16	.59	265.	5 3/16	1.12	504.	6 3/16	1.75	787.	7 3/16	2.00	900.	8 3/16	2.25	1012.
1 1/16	.21	94.5	3 1/16	.62	279.	5 1/16	1.19	536.	6 1/16	1.83	823.	7 1/16	2.08	940.	8 1/16	2.33	1054.
2	.23	103.5	4	.65	292.	6	1.26	567.	7	1.50	675.	8	1.75	787.	9	2.00	900.
2 1/8	.25	112.3	4 1/8	.68	306.	6 1/8	1.34	603.	7 1/8	1.66	747.	8 1/8	1.91	864.	9 1/8	2.16	981.
2 1/4	.27	121.2	4 1/4	.71	319.	6 1/4	1.42	638.	7 1/4	1.75	787.	8 1/4	2.00	900.	9 1/4	2.25	1012.
2 1/2	.30	135.0	4 1/2	.74	333.	6 1/2	1.50	675.	7 1/2	1.83	823.	8 1/2	2.08	940.	9 1/2	2.33	1054.
2 3/4	.32	143.7	4 3/4	.77	346.	6 3/4	1.58	711.	7 3/4	1.91	864.	8 3/4	2.16	981.	9 3/4	2.44	1100.
2 3/8	.34	153.0	4 3/8	.81	364.	6 3/8	1.66	747.	7 3/8	2.00	900.	8 3/8	2.25	1012.	9 3/8	2.50	1125.
2 3/16	.37	166.2	4 3/16	.84	378.	6 3/16	1.75	787.	7 3/16	2.08	940.	8 3/16	2.33	1054.	9 3/16	2.58	1166.
2 1/16	.40	180.0	4 1/16	.87	391.	6 1/16	1.83	823.	7 1/16	2.16	981.	8 1/16	2.44	1100.	9 1/16	2.67	1200.

head lowers, thus tending to higher efficiency and lowered operating cost. From tests made under the most favorable conditions the following relative efficiencies were obtained:

Head	Centrifugal	Screw Pump
2	20%	60%
4	38%	70%
6	55%	76%
8	67%	78%
10	75%	75%

In the past many large irrigation and reclamation projects have been shelved owing to lack of available pumping equipment which would operate at high enough economy to justify the installation cost. Since the advent of the screw type of pump these projects have been revived and many of them now are being carried to completion.

## Question Box

Arrangements have been made to answer through the columns of the Journal of Electricity such questions on electrical construction and other subjects as are of general interest. Inquiries should be sent to the Editor, Journal of Electricity, 883 Mission Street, San Francisco.

Q. 9. Can you give me a table of temperature coefficients in relation to resistance?—H. J. S.

A.

Metal	Values of T.	
	Deg. F.	Deg. C.
Silver .....	.00222	.00400
Copper (annealed).....	.00242	.00428
Aluminum (99%).....	.00235	.00423
Platinum .....	.00137	.00247
Iron .....	.00347	.00625
Tin .....	.00245	.00440
Lead .....	.00228	.00411
Bismuth .....	.00197	.00354
Mercury .....	.00044	.00072
German silver (ave.) .....	.00019	.00033

Formulae: For rise in temp.:

$$R_i = R [1 + (T \times F^\circ \text{ rise})]$$

For fall in temp.:

$$R_i = R [1 - (T \times F^\circ \text{ fall})]$$

Represents the increase or decrease per hour per degree F. or C.

Q. 10. What is the relation between the resistance of distilled water and that of copper?—B.L.N.

A. According to Culley, the resistance of distilled water is 6,754 million times that of copper.

Q. 11. What is the elastic limit of No. 0 hard drawn copper wire?—Wm. H.

A. 39,645 lb. per sq.in. (average).

Q. 12. What is the weight of a cedar pole of 30-ft. length and 7-in. top? How many poles to a carload?—I.N.P.

A. 420 lb. (average) and 75 to the car.

Q. 13. What should be the sag of No. 12 copper wire on poles 100 ft. apart at 100 deg.?—R.J.T.

A. The sag should be 7 in. at span center.

Q. 16. What brand of steel is best suited for permanent magnets?—E.L.B.

A. Tungsten steel. Chrome steel is also good.

# BETTER MERCHANDISING

## Lighting by Rule is Method of Fixture Dealer

A novel booklet in which a small, wooden ruler is inserted in the front cover and bearing the title, "A Rule for Correct Lighting," has proved to be a successful means of arousing interest in fixtures for the English Company, Portland electrical fixture dealers.

The inside of the pamphlet is attractively printed and contains in convenient form workable suggestions as to the placing of switches, fixtures and outlets in the home.

The pamphlet states that it is being mailed to the recipient because there are certain fundamentals which must be observed if the lighting scheme is to be correctly carried out in the home. It asks the reader to bear in mind that the company does no wiring and that the suggestions and recommendations are applicable to the great majority of homes. The height of brackets is given, the locations of lights and switches as well as the types preferable. These are listed for porch, hall, living room, dining room, kitchen, bathroom and bedrooms.

The following excerpts from the text itself will show with what directness and simplicity the information is written, much of the effectiveness of the pamphlet being due to the well worded presentation of this information.

The following suggestions and recommendations are applicable to the great majority of homes.

Do not allow guesswork to enter into the wiring of your home or the placing of switches or outlets.

### General

**Height of Brackets**—Not over 5 ft. 6 in. to 5 ft. 9 in. from finished floor.

**Porch**—Preferable locations:

1. Either side of door.

2. Over door.

3. Ceiling of porch.

Control switch inside hall.

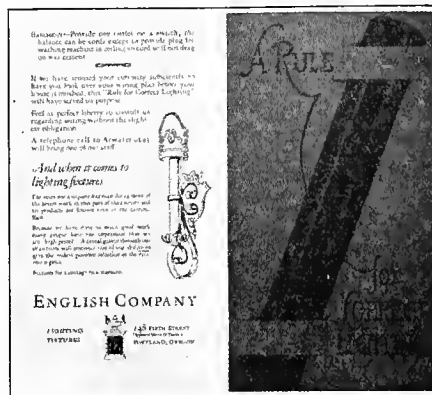
**Style**—Conform strictly to architecture.

See that house number is visible at night.

**Hall Location:**

Ceiling fixture controlled by switch.

Also on 3-way switch if bedrooms are upstairs.



Catchy little booklet on home illumination sent out to prospects by the English Company of Portland, Ore.

Brackets over either side of console table if one is used.

Fixture should express warmth and hospitality.

**Living Room**—Do not put brackets over mantel—put plugs in shelf.

Two kinds of lighting are required:

(a) General illumination for conversational purposes.

(b) Reading lamps.

Shall a ceiling fixture be installed? Let us discuss this with you pro and con.

Let us show you how you can read in any part of the living room without a ceiling fixture.

Provide plenty of base plugs for reading lamps.

**Dining Room**—Run three wires to dining room center so you can have use of toaster or percolator on the table without burning the light. This is especially convenient during breakfast.

Illumination should express hospitality and intimacy, and welcome to guest and family.

If you use candelabra on the table, let us show you how to eliminate hanging fixtures and still not depend entirely on candles when not desired.

Brackets unnecessary except for effect.

With the table amply lighted, the balance of the room can be in shadow and is more interesting this way.

**Kitchen**—(a) General illumination for entire room by a ceiling fixture.

(b) Pendant directly over sink.

(c) Chain pull socket over hood of range.

**Bathroom**—No ceiling fixture necessary.

Preference—1. Brackets either side of mirror.  
2. Over mirror or medicine cabinet.

**Bedrooms**—Generally poorest lighted room in the house.

Shall the fixtures match the wall paper?

Let us show you the system adopted by all the leading hotels in the country, using ceiling fixture only and no brackets.

Generally speaking, a light on either side of dresser and a plug at the head of the bed are ample.

Do you like to read in bed?

Have you ever seen a good bed lamp?



K. L. Francis, general manager of the Albert Sechrist Manufacturing Company, Denver, Colo., designed this new fixture display room in what was formerly a workroom of the factory at 1717 Logan Street. Attractive in its appointments and complete in its facilities for individual display of each fixture, the display room has proved a valuable feature of the company's policy. A control panel in the right hand picture, near the telephone, gives the one in charge complete control of the lighting of every fixture.

## Dealer Uses Boy Salesmen to Sell Mazda Lamps

A combination advertising and lamp sales stunt was successfully conducted recently by the Burgy Electric Works, Vancouver, Wash. Schoolboys were encouraged to work as lamp salesmen after school hours to earn a radio set. No contest was instituted but every boy was given to understand that if he completed the proper amount of work he could earn a set.

On starting to work each boy was instructed in the kinds of lamps to sell for ordinary purposes, and was sent out with a basket of the most commonly used sizes and types, and a price list to which he could refer. In addition he carried a quantity of cards such as the one reproduced herein on which he could report having interviewed a prospect. If the prospect was stocked with lamps and did not want to buy, the boy would ask him to sign the interview card, which counted as a credit toward earning the pre-

ing one set continued long enough to win a second, and those that wanted to stop before the required amount of credit was secured were permitted to pay in cash the balance not yet earned. All told there were fifteen sets earned and a number of others paid for partly in work credits and partly in cash. Besides selling for the store upwards of \$200 worth of lamps, the boys advertised the name of the Burgy Electric Works to hundreds of prospective customers in Vancouver through the medium of the interview cards. It will be recognized that this was extremely low cost advertising.

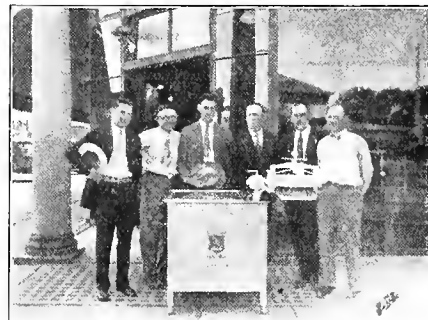
## Washer Sales Exceed Quota in Colorado Campaign

For the first time in history, a carload of electric washing machines was shipped into the Grand Valley district of Colorado as the result of a 30-days sales campaign conducted from the headquarters of the Public Service Company of Colorado at Grand Junction during August and September.

In the shipment were 80 Graybar Electric Clothes Washers to be disposed of in the four cities of Grand Junction, Palisades, Fruita and Rifle.

When the campaign was over it was found that the sales force had over-shot the mark, having placed 104 machines.

The organization which handled the campaign is a new one, the Grand



Sales force of the Grand Valley office of the Public Service Company of Colorado. Left to right: Leroy Reigle, office salesman; C. G. Henderson, R. C. Elliott, H. W. Moore, R. C. Young and H. P. Dockstader, new business manager.

Valley properties having been acquired by the Public Service Company of Colorado on June 1 of this year.

## Twelve Thousand Attend Display Opening

### Southern Colorado Power Company Features Large Merchandising Display in New Quarters

In line with the new merchandising policy of the Byllesby properties, the Southern Colorado Power Company, Pueblo, Colo., recently opened a large new merchandising display room in

new offices in the Colorado Building was made the occasion of a visit by 12,000 people, customers of the company in the territory served.

From the standpoint of acquainting the company's customers with the new facilities to serve them provided in the new building, as well as from a general public relations angle, the opening proved to be unusually successful. The crowd which surged through the new display room containing the merchandising displays was brought in contact with the company's stock and merchandising facilities.

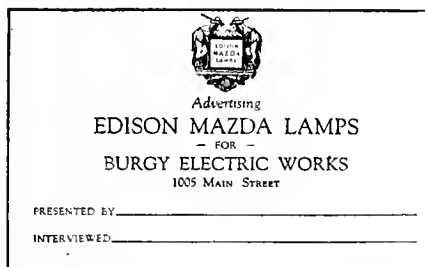
Preparations were made to care for 5,000 visitors. That 12,000 came and registered, many others not registering, was evidence of the interest aroused by the opening and the methods used to bring it to the attention of the public.

Invitations, as reproduced in the accompanying illustrations, were sent to customers in the territory served. Street car patrons were also given invitations to attend the opening. Advertising in each of the city's newspapers invited public attendance.



Twelve thousand people attended the opening of the new offices and salesroom.

connection with its new office building at Main and Fourth Streets. With a well arranged program of publicity and advertising the opening of the



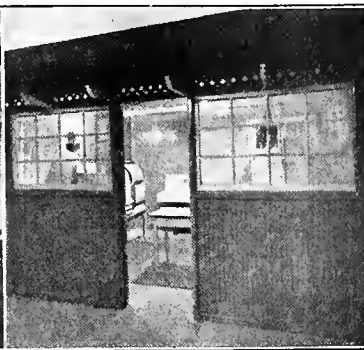
Card of introduction given boys to establish their standing as salesmen for the electrical dealer.

mium, and at the same time advertised the store. When the customer desired a lamp which the young salesman did not happen to have with him delivery was made later. All sales were for cash, and though this caused the boys some trouble in keeping sufficient change on hand, nevertheless it saved the store from carrying small accounts some of which might have proved to be uncollectable.

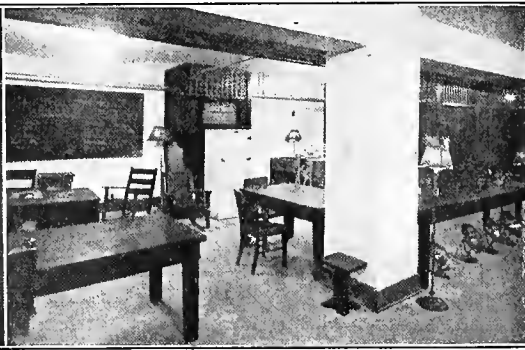
In establishing the basis on which the boys could earn the radio set premium, ten per cent commission was allowed on lamp sales and one cent each was credited for every signed card returned to the office. A total credit of \$1.50 was required before the set was won, and this was just about the wholesale cost of the sets offered. This meant that each winner had to sell \$15 worth of lamps, or, sell \$14 worth and turn in 100 signed interview cards, or some other equivalent combination of sales plus interviews. Some of the boys after earn-



Recreation hall, where employee meetings, sales meetings and public meetings are held.



Model kitchen built in one corner of the basement.



The salesmen's quarters in the basement provide space for desks and appliances to be sold.

### Clever Follow-up Plan

But one of the most adroit features of the plan was the registration card. A card was given each visitor. The card was numbered and a tag bearing the same number was retained by the visitor. A prize drawing was to be conducted upon these numbers, it was announced, and so the cards were in demand.

On the card was written:

#### To Our Patrons:

We appreciate the honor of your presence at our formal opening. The displays of standard, high class appliances have been arranged for your benefit, so just feel free to ask questions or to request demonstrations. New electrical inventions are greatly simplifying the work in the modern home. We want to serve you by furnishing facts and full details of these conveniences, so please enroll with us to aid in our educational campaign.

Southern Colorado Power Company.

On the bottom of the card was space for name, address and phone numbers. The particular value of these cards is at once apparent. As an indication of interest in electrical appliances and serving as a request from the customer for further information, the way was left open for future circularization on appliances. This work is to be followed up by the merchandising department of the company.

Something of the set-up of the new offices may be gained from the following enthusiastic newspaper account of the opening:

"The main floor of the new offices occupies 6,120 sq.ft. of floor space. Windows open on both Main and Fourth. A large display window fronts Main and five full six-plate glass windows admit light from Fourth. Smaller windows punctuate the remainder of the south side of the offices.

"The front portion of the office, 50 x 30 ft., comprises the display room for all modern electrical appliances. Everything electrical will be found neatly shown in this display. In addition to the display window on Main the large windows on the Fourth Street side give the passerby a view of these modern appliances.

"Back of the display space is the cashier, local accounting department, and contact clerks. All equipment is up to the minute. The woodwork is of walnut. These offices require 1,200 sq.ft. of floor space. The office of the manager, assistant manager, general offices, and general accounting department are found in the rear portion of the building.

"The feature that strikes the patron most is the volume of light that floods the entire office. In addition to the spacious windows there are some 500 electric lights. A string of columns divide the front portion of the space and attached to these are outlets for the attachment of various electrical appliances. Two strings of dome

lights, numbering 45 in all, illuminate the display space. In addition to these are various lights on all walls.

### Model Kitchen

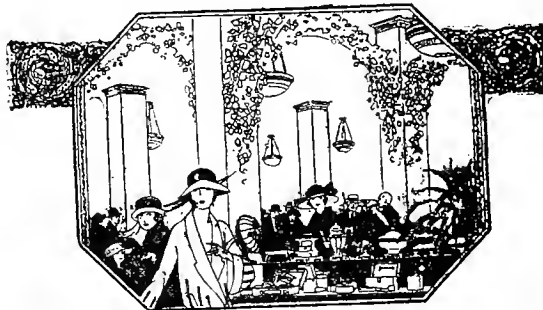
"Entering the basement the patron finds a model kitchen, employees recreation and convention hall, and display room for heavy duty appliances. In the kitchen, so constructed as to resemble the kitchen of a modern bungalow, is found every known appliance that makes the work of preparing a meal easier.

The recreation hall is floored with maple and will offer excellent facilities for dancing. It is well illuminated with eight large lights. The hall will also be used for sales meetings, classes and monthly meetings of various departments. Company officials have long desired such accommodation as this.

"The formal opening will start at noon Saturday and continue until 10 p.m. There will be souvenirs, refreshments and music. Dancing will be enjoyed in the recreation hall. A large orchestra has been engaged to furnish the music.

"E. F. Stone, assistant general manager, is to be congratulated on the planning of the new office. He has been assisted by J. W. Devereaux, vice-president of H. M. Bylesby & Company, the parent organization of the Southern Colorado Power Company."

## You Are Invited to the Formal Opening



### of Our New Appliance Sales Department

Corner of Fourth and Main Streets

Saturday, Sept. 11th, from 12 to 10 p.m.

You are cordially invited to attend and bring your family and friends.

There will be a demonstration of all the latest electrical devices for the home. You will be interested in the model kitchen where you will find every electrical help—the kind of kitchen that every woman wants for her own home.

The displays will interest you—you will enjoy the music, the refreshments, and everyone will receive a souvenir of the occasion.

We Hope  
You Will Accept  
Our Invitation

Southern Colorado  
Power Company

We Want All Our Customers to Get Acquainted With Our New Home.

#### To Our Patron:

We appreciate the honor of your presence at our formal opening. The displays of standard, high class appliances have been arranged for your benefit, so just feel free to ask questions or to request in the modern home. We want to serve you by furnishing facts and full details of these conveniences, so please enroll with us to aid in our educational campaign.

SOUTHERN COLORADO POWER COMPANY

Name \_\_\_\_\_

Address \_\_\_\_\_

No. \_\_\_\_\_

#### GIFT COUPON

Obtain and retain this coupon. Drop the card in one of the registration boxes.

SOUTHERN COLORADO POWER CO.

THIS IS YOUR SPECIAL INVITATION AS A STREET CAR PATRON TO ATTEND THE PUBLIC OPENING OF OUR NEW OFFICE AT FOURTH AND MAIN STREETS, TODAY, (SEPT. 11), BETWEEN THE HOURS OF 12 NOON AND 10 P. M.

THERE YOU WILL FIND ON DISPLAY ALL THE LATEST IN ELECTRICAL APPLIANCES AND A DEMONSTRATOR TO EXPLAIN THEM TO YOU.

FILL IN YOUR NAME AND ADDRESS AND DEPOSIT THIS CARD IN THE SPECIAL BOX PROVIDED IN OUR OFFICE AND YOU WILL HAVE A CHANCE ON A 15-INCH OSCILLATING ELECTRIC FAN TO BE GIVEN TO A LUCKY STREET CAR PATRON. DRAWING AT 10 P. M. TONIGHT, BUT YOU DO NOT HAVE TO BE PRESENT UNLESS YOU DESIRE.

REFRESHMENTS

SOUVENIRS

MUSIC

You Are Always Welcome at the  
SOUTHERN COLORADO POWER CO.  
Cordially Personal Attention to Every Customer

You are cordially invited to attend the formal opening

of the  
New Headquarters

and

Appliance Sales Department

of the

Southern Colorado Power Company

Colorado Building

Corner Fourth and Main Streets

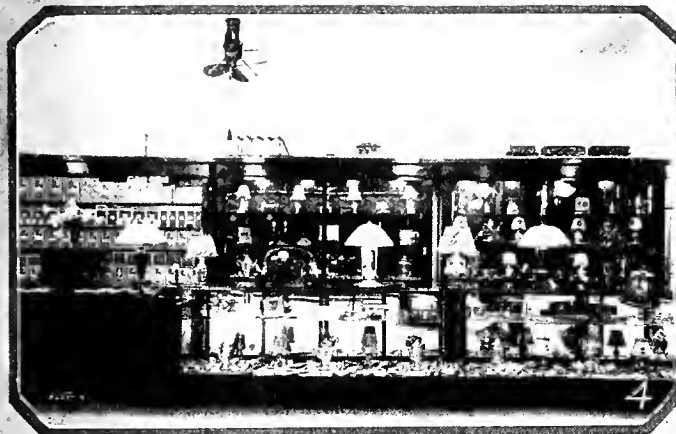
Saturday, September the eleventh

12:30 noon to 10:00 p.m.

A complete line of all the latest electric household and labor saving  
appliances will be demonstrated

Souvenirs Refreshments Music





IN connection with its new offices the Southern Colorado Power Company, Pueblo, opened a large merchandising display and sales room, which it invited all its customers to visit. (1) A general view of the sales room. (2) The showcases and lamp sales counter along one wall of the display room. (3) At night windows on two sides of the building allow ample display facilities. (4) Looking at the lamp counter and small appliance showcases. (5) The company's electric sign and brilliantly lit windows point the populace to this attractive store. (6) One of the formal opening's window displays of small appliances. (7) The large windows on the street give a view from outside the building to the well arranged display floor within. This spacious store was first shown to the public at the formal opening and crowded to capacity by the 10,000 visitors who came. Accompanying photographs show other portions of the new offices, salesmen's quarters and recreation hall of the Southern Colorado Power Company.

# NEWS OF THE INDUSTRY

## San Francisco Manufacturer to Build Plant in St. Louis

The Pacific Electric Manufacturing Company, a Western concern with headquarters and factory in San Francisco, has reversed Horace Greeley's famous mandate and gone East—that is, to the extent of announcing its intention of building a manufacturing plant in St. Louis. The plant, which will be erected in the new industrial district of that city, will cost approximately \$175,000 and in the beginning will employ about 150 men.

The company, which manufactures high-tension electrical switching equipment, competes with Eastern manufacturers, and the heavy freight cost of shipping products East was a large factor in the firm's decision to build the new plant.

The Pacific Electric Manufacturing Company has branch offices and agencies in Los Angeles, Denver, Seattle, Dallas, St. Paul, Kansas City, Birmingham, Chicago and New York. Joseph S. Thompson is its president.

## New Financing Planned by Two Western Power Companies

New financing planned by the Great Western Power Company of California, San Francisco, and the San Joaquin Light & Power Corporation, Fresno, both Western Power Corporation properties, recently was revealed by application made by those companies to the California Railroad Commission for permission to issue and sell some of their securities.

At about the same time the Western Power Corporation, New York, offered for sale \$10,000,000 of its series A 5½ per cent convertible collateral trust gold bonds. Security for the issue of Western Power Corporation bonds consisted of collateral pledged with the National Bank of Commerce, New York, as trustee, of more than a majority, in each case, of the outstanding stock of the Great Western, San Joaquin and Midland companies.

This includes \$27,498,700 par value common of Great Western, being all but directors' qualifying shares; \$9,900,000 par value of San Joaquin common, being 90 per cent of the stock; \$2,000,000 par value San Joaquin prior preferred; \$4,475,000 par value San Joaquin preferred, and \$999,000 par value Midland common.

Equity following these bonds consists of \$9,655,380 par value of preferred stock and 219,000 shares, no par value, common stock of the Western Power Corporation. The bonds will be the only funded debt of the corporation, and the proceeds from their sale will be used to redeem the outstanding \$5,823,000 30-year 6½ per cent sinking fund gold debentures and to provide funds for additional investment in the preferred and common stocks of the corporation's subsidiaries.

The bonds are convertible into common stock of the North American Company, which controls the Western Power Corporation.

The San Joaquin Light & Power Corporation filed application with the California Railroad Commission for permission to issue and sell to Western Power Corporation of New York \$2,000,000 par value of its prior preferred Series "A" 6 per cent stock at \$95 per share, plus accrued dividends; also to issue \$1,000,000 par value additional of that stock and to sell it through its own organization at not less than \$93 per share; also to issue and sell to Western Power Corporation \$4,000,000 par value of common stock at \$50 per share, and to issue and sell from time to time \$25,000,000 par value of its unifying and refunding mortgage 5 per cent 30-year gold bonds of Series "D" at a price to be fixed by the commission, the proceeds from the sale of such securities to be used to retire \$22,725,000 par value of its bonds and to reimburse its treasury for capital expenditures made and to be made.

Great Western Power Company of California applied to the commission for authority to issue and sell to the public \$1,000,000 par value of 6 per cent preferred stock at not less than \$93 per share and to issue and sell to Western Power Corporation \$2,500,000 par value of common stock at \$50 per share net; and to apply the proceeds to the reimbursement of its treasury for capital expenditures.

## Federal Telegraph Company and Brandes Products Merge

Federal-Brandes, Inc., is the name of a new corporation formed through the merger of the Federal Telegraph Company of California with the Brandes Products Corporation, Newark, N. J. The company controls several big plants for wireless operation and the manufacture of radio equipment and acoustical devices located at Palo Alto, Calif., Newark, N. J., Toronto, Canada, and Slough, England.

The head of the combine is Rudolph Spreckels, who has general management of the financial interests. Ellery W. Stone, for nearly three years president of the Federal Telegraph Company, has been made president of Federal-Brandes, Inc. Other officials are: Frederick Dietrich of Newark, N. J., vice-president in charge of production; M. C. Rypinski, vice-president in charge of patents and development; Augustus Taylor of San Francisco, secretary; Walter H. Dood of New York, assistant secretary; J. E. Godcharles of San Francisco, treasurer, and Frederick Dietrich, assistant treasurer. C. A. Spreckels is chairman of the executive committee. On the board of directors, in addition to the officers named, are Howard Spreckels, Robert Hays Smith and Horace Hill, all of San Francisco.

Headquarters of the new concern will be in San Francisco, with offices in the Hobart Building.

## Completion of Melones Dam Is Marked by Dedicatory Ceremonies

Dedicatory ceremonies marking the completion of the dam erected by the South San Joaquin and Oakdale Irrigation Districts 30 miles east of Oakdale in Stanislaus County, Calif., were held Nov. 11.

The dam, built through a co-operative agreement between the farmers of the two irrigation districts and the Pacific Gas and Electric Company, is 185 ft. high. Concurrent with the erection of the dam and as a part of the co-operative agreement, the Pacific Gas and Electric Company is constructing a concrete-lined pressure tunnel from the dam to the site of the power house which is under construction about one mile downstream from the dam. The tunnel and power house are scheduled to be completed early in the spring. The plant will have an installed capacity of 36,000 hp.

In brief, the agreement made between the interested parties provided that the districts should build at Melones a dam capable of storing 112,500 acre-ft. of water and to cost approximately \$2,200,000. The Pacific Gas and Electric Company agreed to build

a power house costing \$2,500,000 and to pay to the districts a total of \$5,175,000 in semi-annual installments of \$64,687.50, over a period of forty years, or a sufficient sum to pay both the principal and interest on the bonds issued by the farmers.

In addition the power company will turn over for the use of the farmers, without charge, the waters stored for power purposes on the Stanislaus River after it has passed through the power company's plants. This water averaging annually about 35,000 acre-ft. heretofore has been purchased by the districts. Plans already have been announced for additional storage of about 40,000 acre-ft. so that the farmers get without charge an extra 75,000 acre-ft.

Under the agreement the farmers control the river and its flow from March 1 to Nov. 1, and the power company for the remainder of the year.

Among the speakers at the ceremonies were W. E. Creed, president of the Pacific Gas and Electric Company, and John Hancock, attorney for the South San Joaquin Irrigation District.

### Motor Prices Reduced by General Electric Company Dec. 1

A reduction in the price of its motors has been announced by the General Electric Company, to be effective Dec. 1.

Stationary motors, in most lines, from 1 to 200 hp. in size, will be reduced approximately 5 per cent. Commonly used types of squirrel-cage induction motors are reduced 10 per cent, bringing the prices of such motors to within about 10 per cent of 1914 price levels. Price reductions affect all direct and alternating current, constant and variable speed, general purpose motors, from 1 to 200 hp.

Improved manufacturing processes, quantity production, and the introduction of labor-saving devices make possible the reduction, according to E. O. Shreve, manager of the company's industrial department at Schenectady, formerly San Francisco district manager.

Coincident with this reduction in prices, the General Electric Company has announced a unified schedule of discounts for different classes of purchasers. The discount for quantity purchased at one time on one firm order has been made uniform on a sliding schedule for all classes of buyers.

### Arizona Republicans to Contest Governor Hunt's Election

The Republican state executive committee of Arizona has decided to contest in the courts the apparent election of George W. P. Hunt as governor of that state. A committee has been appointed, headed by Lloyd B. Christy of Phoenix, to conduct a contest and to obtain funds by general call upon the Republicans of the state. It is estimated that \$10,000 will be needed.

As matters stand now, Governor Hunt, Democrat, apparently has been elected over his Republican opponent, E. S. Clark, by about 270 votes, although four counties so far have failed to report their returns to the secretary of state, according to latest news dispatches.

In 1917 Governor Hunt contested the election of his opponent as governor. The superior court decided in favor of the Republican candidate but its decision was reversed by the supreme court and Governor Hunt was seated.

### Every California County Voted Against Water-Power Act

Final returns from 96 per cent of the precincts of California show that every one of the 58 counties of the state voted against the proposed Water and Power Act at the recent election.

The majority against the measure is 388,356, with the possibility that the total may reach 400,000 when all the returns are in. While the third defeat of the proposal was by a smaller vote than in 1922, when the majority against was 353,849, and in 1924, when 431,602 voted against it, the percentage of "No" votes on Nov. 2 was larger than ever, but the majority was held down by the smallness of the poll as compared with that of 1924. Applying the 1926 percentage to a total vote as large as was cast two years ago would give a majority of 483,000, indicating

the high disfavor in which the measure is held.

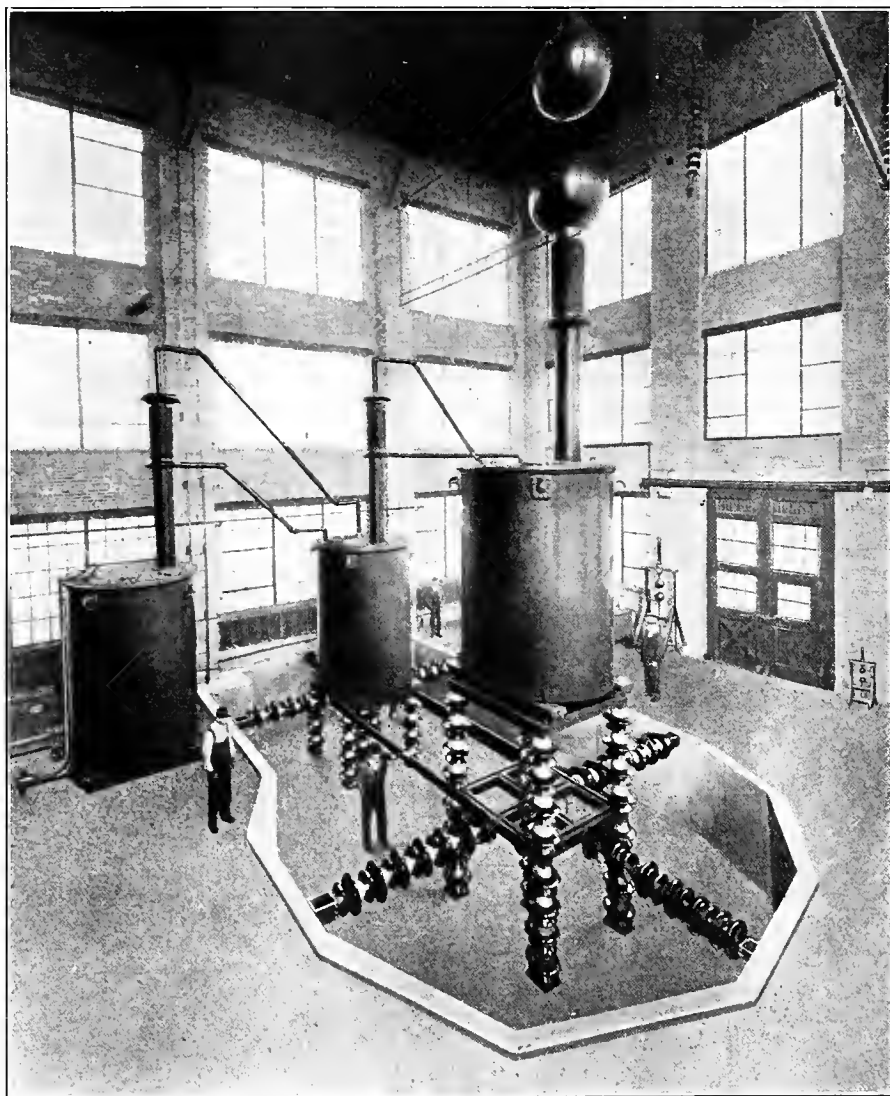
Aside from thinly populated Modoc County, which voted nearly 7 to 1 against the measure, and Alpine County, with a vote of 5 "yes" to 33 "no," the heaviest proportional adverse vote was in Orange County where the ratio was more than 5 to 1. Ventura and San Bernardino voted almost 5 to 1 against the bill, while in Riverside, Monterey, Mendocino, Kings, Napa and Santa Barbara Counties the vote exceeded 4 to 1.

Some of the larger actual majorities against the act were: Los Angeles, 157,151; Alameda, 38,795; San Francisco, 31,818; Orange, 15,083; Santa

### Electric Company Erects 750-kv. Testing Laboratory

Manufacturers of high-tension electrical equipment realize the fact that extensive investigations and tests must be made to insure that the equipment offered for sale will meet the severe conditions imposed by modern interconnection of transmission systems.

The testing laboratory shown in the accompanying photograph has been constructed by the Delta-Star Electric Company, Chicago, is for use of its designing engineers and affords a means of securing the data necessary to make equipment which will have the desired characteristics.



Testing laboratory constructed by the Delta-Star Electric Company of Chicago for its designing engineers. Each of the transformers is of 250-kva. capacity, with primaries of 2,000 volts and secondaries of 250 kv.

Clara, 13,973; San Bernardino, 12,863; San Joaquin, 9,908; Sonoma, 8,335; San Diego, 8,221; Fresno, 8,135, and Stanislaus, 5,412. Two years ago the San Francisco "no" majority was 27,000 and that of Los Angeles 195,000.

**Hydroelectric Power Plant Planned for Carson, Skamania County, Wash.**—W. G. Hufford of Carson, Wash., plans the development of a hydroelectric plant near Carson, Skamania County, with an estimated capacity of 10,000 hp., at an approximate cost of \$250,000.

Each of the transformers is of 250-kva. capacity and weighs approximately 18 tons. They have primaries of 2,000 volts and secondaries of 250-kv. and are arranged for the cascade or chain connection.

Excitation and control of the transformers are secured by a synchronous motor-generator set, the 2,000-volt winding of the first transformer being connected directly to the alternator. With three transformers in series, there are 750 kva. between the high-tension terminal of the third transformer and ground.



## Group Life Insurance Plan Put in Effect by Puget Sound Power Company

Combining life insurance, disability insurance and insured pensions for its employees in one policy, the Puget Sound Power & Light Company, Seattle, has contracted with the Western Union Life Insurance Company, Spokane, for the largest block of life insurance ever written in the state of Washington. The plan, which was a new one to life insurance companies, was evolved after months of negotiation by the officials of the company, and has been approved by the State Insurance Commission, Olympia.

Briefly, the arrangement permits any employee now in the service of the company between the ages of 15 and 69, or any employee entering the service hereafter between 15 and 45, to secure insured protection in the event of death or total and permanent disability, and, at the age of 70, a substantial life annuity, at very favorable premium rates, and with a portion of the premium paid by the company. This portion paid by the company varies with the age of the employee at the time the insurance is taken and increases from 25 per cent at ages 15 to 33 to 75 per cent at age 67 or older.

The amount of coverage under the plan varies with the length of service of the employee. After six months a minimum of \$500 can be secured under the contributory payment-of-premium plan, and this amount increases approximately biennially until a maximum of \$4,624 is reached at eleven years service. Provision is made for additional insurance of the same kind to be taken by the employee under certain conditions and provided that the employee pay the entire amount of the premium of such insurance as is in addition to the amount allowed him based on his years of service. Premiums are collected by payroll deductions.

Subscription to this plan is not made obligatory. In the official announcement it is stated specifically that no

employee will suffer any preference or prejudice in his employment status because he does or does not participate in the plan. Some 3,600 employees are eligible to participate, and if 60 per cent avail themselves of approximately one-half the maximum, as is estimated by insurance officials, the total group policy will amount to \$5,400,000.

### New 3,000-kva. Unit Added to Minidoka Power Plant

The U. S. Bureau of Reclamation's Minidoka power project near Rupert, Idaho, is being increased in capacity by the addition of a 3,000-kva., vertical Allis-Chalmers generator driven by a 3,500-hp. Newport News turbine. The five original generating units in the plant carry a nameplate rating of 1,600 kw. each. Four 1,000-kva. single-phase transformers are being installed along with the new generating unit.

It is expected that the new machine and its equipment will be ready for operation in June, 1927. Estimated cost of the extension is \$230,000.

### McGraw-Hill Company Announces Changes in Personnel

The McGraw-Hill Company of California desires to announce the appointment of the following officers and directors: James H. McGraw, chairman of the board; C. T. Hutchinson, president; Edgar Kobak, vice-president. These officials with N. A. Bowers, Pacific Coast editor of Engineering News-Record, and George C. Tenney, managing editor of the Journal of Electricity, will constitute the board of directors.

Mr. Kobak is vice-president and general manager of sales for the McGraw-Hill Publishing Company, with headquarters in New York City, and is also publishing head of the electrical group of McGraw-Hill publications, of which the Journal of Electricity is one.

## Permit for Further Development of Skagit Granted Seattle

A preliminary permit for three years has been granted by the Federal Power Commission to the city of Seattle for further development of its power project on Skagit River in the Mt. Baker National Forest, Whatcom County, Wash. The proposed project is designed to utilize the entire head of the river between the Canadian boundary and the city's present power house and dam at Gorge Creek.

The proposed development is to be constructed in three stages, consisting of three dams each with appurtenant power structures. One of the dams will be midway between the tunnel intake at Gorge Creek and Diablo Canyon, another at Diablo Canyon and a third at Ruby Creek. The estimated power capacity of the project is 260,000 hp. It is proposed to transmit the power to Seattle for general public-utility purposes and to develop it as the city requires additional power.

### Emeryville Factory Site Bought by Magnavox Company

The Magnavox Company, whose general offices and factory are in Oakland, Calif., has announced that it has purchased a factory site in Emeryville, Calif., and intends erecting buildings upon it in the near future. The property, which takes in a whole block containing very close to four acres, is on Park Avenue north and west of the Emeryville city hall.

Details of the new factory have not been completed, but the company states that the buildings will permit of the adoption of the very latest machinery and methods.

The company manufactures radio apparatus and electric heating devices.

### Second Unit of Valmont Plant Has Been Completed

Installation has been completed on the second generating unit of the Valmont plant of the Public Service Company of Colorado. Tests, which have been eminently satisfactory to date, are now in progress and it is expected that the unit will be turned over to the company before the first of the year.

The new machine is a General Electric Company 35,000-kw., nine-stage type. It operates at 1,800 r.p.m., utilizing steam at 700 deg. F. and 375 lb. pressure. Its installation brings the capacity of the plant to 65,000 kw. The work of placing it has been in progress since last February. The total cost is approximately \$925,000.

The Valmont plant is of particular interest through the fact that it utilizes pulverized lignite coal for fuel, being the largest plant of this type in existence on an artificial lake.

**Telephone and Light Company to Sell its Properties.**—California Telephone & Light Company has been authorized by the Railroad Commission to sell its telephone properties located in portions of Sonoma, Mendocino, Napa and Lake Counties, Calif., to Sacramento Valley Telephone Company for the sum of \$400,000, of which \$300,000 is payable in cash and \$100,000 in a note payable in two years, and guaranteed by The Pacific Telephone & Telegraph Company.



This gas-electric coach, the first of its kind on the Pacific Coast, was built for the Los Angeles Railway by the Fageol Motors Company, Oakland, Calif., and is proving itself entirely satisfactory in operation.



## Electrical Advertising Program Directors Begin Work

At a recent meeting the board of directors appointed by W. W. Freeman, president of The Society for Electrical Development, to sponsor and direct the electrical advertising co-operative market development program, completed its organization plans in accordance with the specifications laid down in the market development plan.

Reports of subcommittees covering a survey of the potential market, a local sales plan and recommended basis of membership, with such modifications and changes as recommended by the committee, were received and approved and will be embodied in the Plan Book which now is to be prepared in its final and completed form for approval by the committee before printing. As soon as ready, the Plan Book, together with membership application blanks, will be sent to all concerns in the industry with the recommended basis for estimating subscriptions.

For guidance in carrying forward this activity the following resolution was adopted: "The electric sign manufacturers, as organized under the market development plan, purpose to carry on a market development program to demonstrate the value of and popularize electrical advertising, and to supply assistance to local committees in bringing this home definitely to users and prospective users of electrical advertising in all its forms."

Included in the personnel of the board of directors are P. D. Howse, of the Electrical Products Corporation, Los Angeles, who is a member of the commercial group, and George W. Kleiser, of Foster and Kleiser, San Francisco, who is one of the outdoor and display group. The chairman is O. D. Ziegler of the Reynolds Electric Company, Chicago.

## Specially Developed Bearings on C. M. & St. P.'s Olympian

The Olympian, the Chicago, Milwaukee & St. Paul Railroad's fast train running from Chicago to Tacoma and Seattle, is to be equipped with bearings manufactured by the Timken Roller Bearing Company, Canton, Ohio, according to announcement. A recent order placed by the railroad company covered bearings for 127 railroad cars, the equipment to be used on nine trains for the Olympian, one each day, each way, and on three trains for the Pioneer Limited, which runs between Chicago and Minneapolis. A large portion of this railroad's system is electrified.

The Timken company has been experimenting with railroad bearings for several years and now has developed a bearing which meets the requirements of railroad service. It is claimed these bearings are peculiarly suitable for this service because of their tapered design which enables them to carry loads and shocks not only from above but also from the side thrust.

## Plan for Seattle-Tacoma Highway Lighting Submitted

A plan which provides for illumination of the entire new highway between Seattle and Tacoma, a distance of 24 miles, and known as the Seattle-Tacoma Highline, has been submitted by J. D. Ross, superintendent of the

city lighting department of Seattle, to the King County Planning Commission. The proposed work would cost \$100,000 for concrete light poles, which would be installed 300 ft. apart. Crossarms from the poles would shed a diffused light over the highway so that machines could extinguish their own lights thus averting accidents from glaring lamps. Engineers estimate that it would cost \$5,000 a year for current and \$5,000 annually for maintenance, and it is planned to have the state finance the project.

Mr. Ross submitted the project to the planning commission on behalf of the Seattle Light Club, of which he is president, and the Puget Sound Chapter of the Illuminating Engineers of America. The city of Tacoma also is vitally interested in the project and has detailed R. E. Horne, an engineer, to make a complete investigation of the plan.

## Four New Power Plants Planned to Be Erected in Japan

Four new power plants are to be constructed in Japan, according to Denkinotomo. Two of them will be built by the Shinetsu Electric Power Company, which recently obtained official permit to erect an 80,000-kw. plant on the Shinanogawa River, to be completed in 1930. The second plant, also of 80,000-kw. capacity, is to be commenced immediately after completion of the first one.

Construction of a 12,000-kw. power plant will be begun by the Kiushu Transmission Company on the Gokase River as soon as the official permit has been secured. The fourth project is that of the Government Iron Foundry which is planning to build a 20,000-kw. generating plant at Yahata in order to electrify its entire works. The cost of construction is estimated at 2,000,000 yen (about \$1,000,000).

## B. C. Company Plans Second Bridge River Unit

Owing to the development of Vancouver and the Frazer Valley, the British Columbia Electric Railway already is planning to duplicate the first unit of its Bridge River hydroelectric project in order that it may be ready within three years of the opening of the initial 60,000 hp. unit, according to announcement of W. G. Murrin, vice-president.

The preliminary work at Bridge River is nearing completion, and work on the construction of dams, penstocks, powerhouses, and lines will be started early in the new year. To facilitate the movement of supplies to the camps, the company has made three and a half miles of new road and it has re-conditioned five miles of old road from Seaton Lake to the Bridge River site. Full details of the proposed Bridge River development were published in the Oct. 15, 1925, issue of the Journal of Electricity, p. 305.

Mr. Murrin further stated that at the next session of the provincial legislature his company would apply for power to consolidate its several subsidiary companies, thus co-ordinating its various activities in British Columbia, in order to cope more effectively with the growth and development of the country.

## Headquarters Opened in Portland by New Jobbing Concern

Announcement of the organization of the A. & F. Supply Company at Portland by Millard Sebern, formerly of the Washington Electric Supply Company of Spokane, marks the opening of a new jobbing concern which will distribute electric supplies in the eleven Western states.

Mr. Sebern was long with the Washington Electric Supply Company, recently sold to the Fobes Supply Company, having begun as a shipping clerk and worked up to the position of manager.

Because of the new A. & F. company specializing in the sale of water tank covers and electric water heaters, the Arthur & Fowler Company of Spokane has determined to open a branch factory in Portland to supply that demand for the new distributing company.

## News Briefs

**Additional Funds Sought to Complete Arch Dam Experiment.**—To complete the experiment on the test arch dam built on Stevenson Creek near Fresno, Calif., Engineering Foundation is seeking funds to raise the dam until it breaks under water pressure. At an expense of \$110,000 the dam was raised to a height of 60 ft., and it did not break at that height even when the reservoir was filled so full that some of the water flowed over the top of the dam. (Journal of Electricity, Oct. 15, 1926, p. 310.) To cause the dam to break under pressure of water in the reservoir back of it may necessitate building the dam up 10, 20, 30, or possibly 40 ft. higher, or to a total height of 100 ft., at a further expense of some \$30,000.

**Oil-Electric Locomotive Used by California Lumber Firm.**—A 100-ton oil-electric locomotive is being used by the Red River Lumber Company, Westwood, Calif., to haul logs daily from the woods, a distance of 20 miles. Maximum grades of from 2 to 3 per cent offer no obstacle to the engine, which is a joint product of the American Locomotive, Ingersoll-Rand and General Electric companies.

**Lighting Service in Marysville, Wash., Improved.**—Improvement of electric light service in Marysville, Wash., and north of that town by a new line is under way by the Puget Sound Light & Power Company, Seattle. The new line will carry 11,000 volts and will cost \$30,000.

**Reports on Preliminary Work on Aberdeen Project Filed.**—Reports on the progress of preliminary work on the Wynooche water and power project, by the city of Aberdeen, Wash., have been filed with Philip H. Dater, district engineer of the U. S. Forest Service, and representative of the Federal Power Commission. A permanent permit for the continuance of construction and location of the dam and power plant there are expected in the near future, city officials state. Permission for the water system has been granted.

# Pacific Coast Electrical Association

## Responsibility of Commercial Department Stressed at Section Conclave

Increased appreciation of the responsibility of the commercial departments of the electric light and power companies and a more clear-cut understanding of the possibilities of the commercial field were brought forcibly to the attention of the 125 commercial men who attended the general conclave of the Commercial Section of the Pacific Coast Electrical Association held at Santa Cruz, Calif., Nov. 12-13, 1926. A general meeting under the chairmanship of H. K. Griffin, Western States Gas & Electric Company, a feature new to these gatherings, was addressed by three speakers of outstanding importance in the industry on the afternoon of the opening day and helped to make the conclave what was generally conceded to be the finest of its kind held on the Pacific Coast in recent years.

S. Waldo Coleman, president of the Pacific Coast Electrical Association, and president of the Coast Counties Gas & Electric Company, was the first speaker on this program, and in his address on "The Selling Problem of the Electric Light & Power Industry" pointed out that while California has been a national leader in total generation and sale of electric energy, it ranks almost at the bottom of the list in average annual kilowatt-hour sales per domestic consumer. He stated that the national average is 365 kw-hr. per consumer and that in California the average is only about 300 kw-hr. per consumer. The application of mass sales, that is, greater sales to existing consumers, just as the industry has applied mass production in the generation of energy, will quickly correct this situation, Mr. Coleman stated.

In discussing the methods to be employed in achieving greater residential consumption, Mr. Coleman said:

The subject of increasing the sale of electrical merchandise is receiving probably more attention today by those in the commercial departments of our companies than any other one subject. It is a subject worthy of the metal of the best men in the industry. As in most sales work the methods to be employed cannot reach a permanent standard; in other words, we will never be bale to say finished. But let us not allow any preconceived notions to hamper us from realizing that artificial barriers of trade are not of permanent value, but encourage in every way possible whatever methods of distribution are economically sound. Whether the power companies sell merchandise or not, the public naturally looks to them for

guidance in how and where it can best be served with the devices and appliances which it is necessary to have in order that they may obtain the greatest benefit from the use of electric current. This is a call that must be answered by the commercial men of our industry.

A. C. McMicken, general sales manager, Portland Electric Power Company, who traveled from the Northwest to address the meeting, indorsed central station merchandising in no uncertain terms and presented excerpts from letters and telegrams from the commercial manager of practically every utility in the Northwest in sup-



Part of the Los Angeles contingent which came up from that city on a special train to attend the general conclave of the P.C.E.A. Commercial Section. The gentleman shading his eyes from the sun is W. C. McWhinney, vice-chairman of the section.

port of his stand. He stated that, as a result of unanimity of commercial policies and practices and active merchandising, Northwest electric light and power companies have built load faster than the normal growth and have raised the average consumption well above the national average of 365 kw-hr. per year.

In proof of this statement Mr. McMicken said:

That this national average can be built profitably to higher levels is proved by the records of the company I represent. For the year 1918 the average consumption of all our residential customers was 245 kw-hr. per annum. For the year 1925 that average had increased to 558 kw-hr. per annum and will probably run approximately 630 kw-hr. for the year 1926. This means that the average residential customer in 1926 will use two and one-half times the number of kilowatt-hours used in 1918, and this change has taken place without any change in rates and is due in part to better illumination standards and in

part to the use of current-consuming devices, electric ranges and water heaters. Other companies in the Northwest can present similar figures. This increase is not due to the normal growth of the use of electricity in the home, but to the more or less sustained effort to build load faster than the normal growth and illustrates in a small way what can be accomplished. Commercial men must recognize their responsibility and go into the field and sell more kilowatt-hours. We cannot dodge the issue and we cannot delegate the job.

Ray W. Turnbull, Pacific Coast district manager, Edison Electric Appliance Company, in an extemporaneous and rapid-fire talk, set forth so convincingly the place of good salesmanship and good salesmen in a merchandising set-up that he left no doubt in the minds of his hearers of the necessity for trained salesmanship in load building programs.

"You have to sell these kilowatt hours through the medium of merchandise which can be seen," he told the section. "Therefore you are in the merchandising business." He then set forth the principles upon which good merchandising should be built. An analysis of the situation was of first importance, he pointed out, and then a program to work to. But most im-

portant of all was the necessity of having high-grade salesmen to carry out such a program. The carrying out of a sales program could not be turned over to "someone in the bookkeeping department or to the office boy" just because they had been faithful to the company for many years.

"There are four fundamentals to the salesmen's responsibility," he stated, and enumerated them as:

1. Every employee should have a personal sense of responsibility in the company.
2. Give every man a definite responsibility and give him enough authority to carry it out. If he has a specific job to do he cannot pass the buck if it is not done.
3. Every man must have a complete knowledge of the goods he is selling.



Here are most of the one hundred and twenty-five men who attended th lif., Nov. 12-13.

Santa Cruz, Cae general conclave of the Commercial Section, P.C.E.A.; that was held in

This is old stuff, but it is still one of the most important factors of selling.

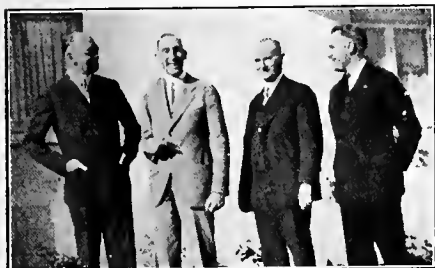
4. Have a workable program, a selling plan, so that your men have some definite aim and goal to work for.

Taking up these four fundamentals in detail Mr. Turnbull stressed the importance of each. Of the first he urged taking the employees into the confidence of the company, as to sales costs, and pointing out that lowered costs should reflect in better compensation. Definite responsibility, he showed, weeded out weak salesmen from an organization and kept them from leaning on and being supported by strong men. Knowledge of the goods he said was all too uncommon, and that often a purchaser of an electric appliance never learned all of its advantages until he had been using it for several months.

In the matter of sales plan he urged especially the value of training for salesmen by thorough education in the workings of the company and equally thorough knowledge of the appliances sold. He urged the cultivation of a "use it" atmosphere in selling, emphasizing the usefulness of the appliance sold.

As to compensation for salesmen Mr. Turnbull was emphatic. "You only get what you pay for," he cried, "and if you can get salesmen who can make more money than the general superintendent, hang on to them. There are not many of them in this world and they are worth it."

Following Mr. Turnbull's talk the meeting was opened for discussion. In this discussion many other angles of the merchandising problem were brought forth and experiences related



The Big Four at the general conclave. Left to right—H. K. Griffin, section chairman, and commercial agent, Western States Gas & Electric Company; A. C. McMicken, sales manager, Portland Electric Power Company; S. Waldo Coleman, president of the association and also of the Coast Counties Gas & Electric Company, and Ray W. Turnbull, Pacific Coast district manager, Edison Electric Appliance Company.

pertaining to particular conditions. It was generally expressed that such information should be brought to the attention of power company executives. J. F. Pollard, manager of the Coast Valleys Gas & Electric Company, in response to this suggestion, declared that executives were hungry for just such information from those who attended section meetings.

Friday and Saturday mornings were devoted to meetings of the various committees of the section along the program outlined by the executive committee. (Journal of Electricity, Oct. 15, 1926, p. 312.) In addition to the committee work previously outlined Chairman Griffith stated that the electric truck committee had been delegated the task of investigating the apparently slow development of electric truck business in California.

One of the important undertakings of the section this year is to outline and perfect a plan of operation which will bring about continuity of effort and permanence of the work of the section. A report prepared by a committee under the direction of Glen D. Smith, Ontario Power Company, was presented to the executive committee for action and will be acted upon before the next meeting of the section in southern California during the third week in March.

### Campaign of Accident Prevention Education Proposed

By M. S. SLAUGHTER, chairman P.C.E.A. Accident Prevention Committee.

Numerous points of importance were discussed at the recent Chicago meeting of the accident prevention committee. A survey of the accident prevention activities of the various utility companies is to be made and a definite plan of organization outlined for an educational campaign to extend the work among those now not taking full advantage of it. To arrive at a definite measure of comparison among various member companies in each division and in the industry as a whole, a statistical subcommittee is proposed.

As a matter of interest and education, all unusual accidents are to be especially investigated by a subcommittee. More than twenty applications for Insull Medal awards were approved.

### Dates Set for P.C.E.A. and Northwest Conventions

The 1927 convention of the Pacific Coast Electrical Association will be held at Santa Cruz, Calif., June 14-18, with headquarters at the Casa del Rey. R. L. Cardiff, manager, Coast Counties Gas & Electric Company, has been named general convention chairman.

Salt Lake City has been chosen for the 1927 convention of the Northwest Electric Light and Power Association, and the dates set are June 21-24. J. A. Kahn, president of the Capital Electric Company, has been appointed chairman of the entertainment committee, and P. M. Parry, commercial manager of the Utah Power & Light Company, is chairman of the program committee.

## A. I. E. E. News

Six Pacific Coast Men Transferred to Grade of Member.—E. L. Bettannier, Municipal Light & Power Department, Pasadena, Calif.; H. H. Henline, Stanford University, Palo Alto, Calif.; F. O. McMillan, Oregon Agricultural College; H. Michener, Southern California Edison Company; C. E. Mong, The Pacific Telegraph & Telephone Company, Seattle, and A. Morrow, Standard Oil Company, Richmond, Calif., have been transferred to the grade of member according to official announcement.

Associates Elected.—J. W. Dowdy, San Francisco; R. E. Kempf, Berkeley, Calif.; A. Maiman, Fresno, Calif., and S. A. Scanavino, Stockton, Calif., have been elected associate members.

## Book Reviews

"Stokers and Furnaces" is the title of a serial report of the Technical National Section, N.E.L.A., recently released from the press. This 50-page booklet covers some of the more important developments of the past year in design, operation and maintenance of stoker equipment and furnaces. Statements by operating and manufacturing companies on automatic and manually controlled combustion systems are included. An article on foreign stoker practice is presented, and numerous improvements in stoker and furnace equipment are reported in the manufacturers' statements. The price to members is 55 cents.

An Investigation of the Fatigue of Metals.—Bulletin No. 152 of the Engineering Experiment Station of the University of Illinois, Urbana, Ill., and listed at 50 cents. A report of the investigation conducted by the experiment station in co-operation with the National Research Council, the Engineering Foundation and several manufacturing concerns. Continuous progress has been made in this study since 1919, and the current report is the seventh of a series, part of which has been published by the University and part by the Engineering Foundation.

Safety Rules for the Operation of Electrical Equipment and Lines.—Handbook of the Bureau of Standards, No. 8. Price 15 cents. Government Printing Office, Washington, D. C. This handbook contains Part 4 of the National Electrical Safety Code. The Code formerly was published in the form of a single volume, but the demand for publications of a handier form has been answered by the publication of the fourth edition of the Code in both the single-volume and the handbook form. Each handbook contains a single part of the Code.

Quantity of Wood Treated and Preservatives Used in the United States in 1925.—By R. K. Shelphenstine, Jr., U. S. Department of Agriculture, Forest Service, Office of Forest Products, Washington, D. C. This is a very comprehensive report and presents a large quantity of information that should be of service to those interested in this subject.

Combined Concrete and Timber in Flexure.—By George Danforth Burr, student in civil engineering, University of Washington. This bulletin presents the results of laboratory tests upon full-size combination concrete and timber structures. Information is presented that should be of interest to structural and design engineers and that should pave the way for further developments in this particularly interesting field. This publication is known as Bulletin No. 37 and may be obtained from the Director of the Engineering Experiment Station, University of Washington, Seattle. Price not quoted.



## News of the Electragists



### Hear Report of Hill on Article Five and Hutchinson on Wiring Conference

Ben C. Hill, president of the California Association of Electrical Inspectors, and C. T. Hutchinson, president of the McGraw-Hill Company of California, related to a large meeting at the Palace Hotel, San Francisco, Nov. 19, composed of contractors, manufacturers' representatives, jobbers and central station representatives, reports of the recent meetings in the East which they had attended dealing with modern trends in wiring.

Mr. Hill as representative of the electrical industry in the West attended a meeting of the Article Five committee considering the revision of that article in the National Electrical Code. Mr. Hill, supervising inspector, City of Oakland, was sent by the California Electragists and California Electrical Bureau to Atlantic City to bring the Western viewpoint to bear upon the proposed revision.

In his report on the activities of that committee, Mr. Hill stated that more detail in every respect and a number of added sections covering new wiring methods have been incorporated in the revision. Among these the consideration of the use of non-metallic sheathed cable, metal duct, underfloor raceways, etc., were included in this code revision.

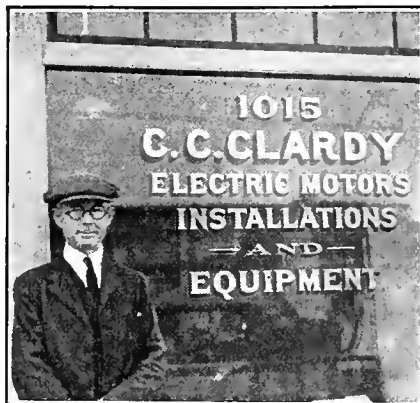
Mr. Hill started with a review of the set-up for the proposed code revision. A committee on each article of the code is reviewing that article and submitting proposed changes to the code committees. At this meeting of the Article Five committee were representatives from North Carolina, New Jersey, Illinois and California. A. Penn Denton was chairman of the meeting. W. J. Canada, electrical field secretary for the National Fire Protection Association was responsible for many of the rewritten revisions of the code as suggested in the meeting. Mr. Hill stated that Mr. Canada had written into these revisions more detail than had ever before been incorporated in the code and that the new code when issued would tell contractors when and how electrical wiring was to be installed. The plan was to make it so complete that all local requirements could be torn up and one could say "Let the Code decide."

In general the rules for non-metallic sheathed cable were drawn tighter, those for armored cable were drawn tighter, and the use of bare conductors in raceways, and of thin metal tubing was referred to the technical committee.

Mr. Hill stated that the Electragists as a group were being felt and that the tendency on the whole will be to keep standards high rather than to let them down in any respect. Any effort to tear them down will be opposed unless it can be proved that present requirements result in waste of material or money. Mr. Hill emphasized the

fact that the committee had acted without prejudice and was uninfluenced and that the West was being recognized in these proceedings. He stressed the fact that rubbing shoulders with those of the East was bringing about a closer relationship between the West and the East.

The Article Ten committee meeting after that of Article Five, Mr. Hill stated, was reconsidering the revisions



C. C. Clardy is one of the very active members of the San Diego branch of the California Electragists.

of rotating machinery provisions and proposing wiring tables for motors based on the nameplate reading of the motor.

Of Article Five itself several new sections have been proposed and a new title given the section. The new title will be "Wiring Types, Systems, and Methods." The following changes will be made in the titling of sections and the sections added will be found in the revised code:

- 504 Raceways for surface wiring.
  - 505 Armored cable.
  - 506 Underfloor raceways.
  - 507 Non-metallic sheathed cable.
  - 508 Decorative lighting.
  - 509 Insulation resistance.
  - 510 Auto transformers.
  - 511 Recognized electrical types of interior wiring.
  - 512 Special requirements for use of flexible cords.
  - 513 Bare conductors.
  - 514 Bare grounded wire systems.
  - 515 Tin wall metal tubing.
- The last three were referred to the technical committee for their investigation.

Charles T. Hutchinson reported in some detail and with a good deal of humor the joint wiring conference held in New York City in which the National Electric Light Association, the Association of Electragists, International, the National Electrical Manufacturers' Association and the Electrical Supply Jobbers Association had gone into the study of wiring costs. Earl

E. Whitehorne of the McGraw-Hill Company, acted as referee.

In reviewing this meeting Mr. Hutchinson gave the gist of the testimony presented by the various groups and ended by reading portions of the very strong brief presented by the Electragists at that meeting. Mr. Hutchinson said that further conferences on this matter were expected in December.

### Northwest Inspectors' Standards Committee Active

The work of the Standards Committee of the Northwest Association of Electrical Inspectors, with E. G. S. Pryor, resident engineer, Underwriters' Laboratories, Inc., Seattle, chairman, has been going forward. Recommendations for changes in the National Code will be brought by the committee before the convention of the association in January.

Other members of the committee are: A. A. Tobey, Morrison Electric Company, Portland, sub-chairman; J. J. Agutter, contractor, Seattle; H. S. Jenkins, chief electrical inspector, Bellingham, Wash.; R. E. Thatcher, superintendent of service central district, Puget Sound Power & Light Company, Seattle; H. A. Patton, electrical engineer, Washington Surveying and Rating Bureau, Seattle; T. W. Stevens, municipal power and light department, Seattle; F. D. Weber, electrical engineer, Oregon Insurance Rating Bureau, Portland; F. H. Murphy, illuminating engineer, Portland Electric Power Company, Portland; and L. W. Going, chief electrical inspector, Portland.



About to start something, is Bill Conery who, with Ted White, makes up the Gas & Electric Service Company of Chico, Calif. What Bill is about to start is another electrical installation in the way of a starter.

### Canada to Speak at Convention

Word has recently been received by the secretary of the Northwest Association of Electrical Inspectors, F. D. Weber, electrical engineer, Oregon Insurance Rating Bureau, Portland, that W. J. Canada, electrical field secretary, National Fire Protection Association, will be present to address the convention. Other features of the convention program have not yet been worked out to a point where they can be announced.



## Meetings

### Electrical Heating Association Formed in San Francisco

In order to promote the use of electricity for industrial, commercial and domestic heating, a number of those interested in San Francisco have decided to organize an association to be known as the Electrical Heating Association. A meeting was held Nov. 17 at the States Restaurant, at which the following were present: C. R. Owens, General Electric Company; Arthur Kempston, Apex Manufacturing Company; H. G. Landis, Miracle Heater Company; C. R. Sullivan, Westinghouse Electric & Manufacturing Company; R. Turnbull, Edison Electric Appliance Company; J. L. Farley and C. H. M. Smith, Pacific Gas and Electric Company; J. W. Wrenn, W. J. Walsh, O. F. Anderson, F. W. Davies and D. Larnach, all of the Great Western Power Company; H. H. Daley, H. A. Mulvaney, A. Strauch and Richard A. Fisk, all of the Majestic Electric Appliance Company; T. J. Mellon, Wesix Electric Heater Company.

The meeting was an interesting one, and some very good talks were made by Ray Turnbull, Harry Daley, Harry Mulvaney, Arthur Kempston and C. R. Owens. J. L. Farley acted as chairman and C. R. Owens as secretary.

A nominating committee consisting of C. R. Owens, H. A. Mulvaney and J. W. Wrenn was appointed to select officers and committees for the association. The nominating committee met the following day and nominated the following officers and committees:

President—John L. Farley; vice-president—Arthur Kempston; secretary and treasurer—C. R. Owens; executive committee—W. W. Hicks, Harry Daley and D. Larnach; program committee—R. Turnbull, H. E. Sandoval and Floyd E. Crawford, Electric-Steam Radiator Corporation; educational committee—E. A. Wilcox, H. C. Landis, C. R. Sullivan and R. J. Larrabee; rate application—W. J. Walsh, A. Strauch and

C. H. M. Smith; publicity committee—W. A. Cyr, Journal of Electricity; Walter Heston, Electrical World.

The president and secretary will be members of all committees.

The nominations were to be submitted to the association for approval at its next meeting, which was set for Dec. 1.

### COMING EVENTS

#### Pacific Coast Electrical Association—

Purchasing and Stores Section Meeting  
San Francisco, Dec. 2-3, 1926

Advertising-Publicity Section—  
Quarterly Meeting  
Edison Building, Los Angeles  
Dec. 3, 1926

#### Northwest Association of Electrical Inspectors—

Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 17-18, 1927

#### Pacific Division, Electrical Supply Jobbers' Association—

Quarterly Meeting—Hotel Del Monte,  
Del Monte, Calif.  
Jan. 27-29, 1927

#### Northwest Electric Light and Power Association—

Commercial Section  
Multnomah Hotel, Portland, Ore.  
Feb. 10-11, 1927.

### Station Superintendents of Utah Utility Hold Conference

The annual conference of production and transmission department station superintendents of the Utah Power & Light Company was held at the company's general offices in Salt Lake City Oct. 18-19. The morning session on Oct. 18 was presided over by B. E. Gordon, superintendent of the company's Grace plant. J. A. Hale, chief engineer, and Cooper Anderson, superintendent of production and transmission, made brief introductory talks, after which this session was devoted to reports of various committees appointed at the 1925 conference.

At the ensuing sessions the following papers were presented and discussed:

Acoustic Shock Absorbers for Telephone Sets.....	R. C. Day
Education.....	
H. T. Plumb of the General Electric Company	
Reducing Hazards in Station Bus Structures.....	P. P. Ashworth

Essential Details to Successful Station Operation.....	A. L. Jones
Fire Prevention and What to Do in Case	
Fire Breaks Out.....	W. J. Hancock
Assistant Chief of Salt Lake City	
Fire Department	
Type "A" Master Clock and Telechron and	
System Speed Regulation.....	R. W. Davis
System Operation During Past Year.....	
.....	H. H. Krueger
System Dispatcher	
High Tension and High Attention.....	E. L. Bourne
Observation of Foreign Engineering Work	
.....	A. N. Geyer
Water Measurements.....	B. T. Hegwer
Preventive Measures to Combat Flu and	
Other Contagion.....	Dr. J. C. Landenberger
Cutler Development (illustrated by moving	
pictures).....	S. W. Kittleman
Work Being Done on Lifton Inlet Channel	
(illustrated by moving pictures).....	
.....	Frank Dusenberry
Production.....	R. E. Pierce
The Purpose and Value of Conference.....	
.....	M. P. Goudy
New Developments in Radio.....	H. T. Plumb

Practically all of the papers brought forth extensive discussion, and much benefit was derived by those in attendance as a result of the conference.

A feature of the gathering was a banquet on the evening of Oct. 19, at which A. W. Ivins, of the first presidency of the Mormon Church, gave an interesting talk concerning conditions in Mexico.

### Colorado League Members Visit Valmont Steam Plant

On the invitation of R. G. Gentry, manager public relations department, Public Service Company of Colorado, Denver, members of the Electrical League of Colorado and their families visited the Valmont power plant of the company a short time ago. Those acting as hosts and hostesses for the occasion were Messrs. and Mesdames Clare N. Stannard, Charles A. Semrad, Guy W. Faller, R. G. Gentry, O. A. Weller, H. T. Hughes, F. R. Jamison, O. L. Mackell, Clarence Keeler, F. F. McCammon, A. E. Addie, J. A. Miller, G. B. Buck, F. S. Henderson, John Elftman, E. K. Hartzell, Messrs. J. E. Loiseau and V. L. Board.

Following an inspection tour of the plant, refreshments were served. Dancing concluded an enjoyable and instructive outing.

### E.T.A. Donates to San Francisco League's Kiddies' Box

At a recent meeting of the Electric Transportation Association in San Francisco it was decided that the organization donate \$25 to the Kiddies' box at the Electrical Development League and that the presentation be made by a committee consisting of K. I. Dazey, Eddie Wood and Walter J. Walsh at the meeting of the Electric Development League on Dec. 13, the Monday before the league's annual Christmas party to the kiddies. In this connection members of the Electric Transportation Association were urged to be present on Monday, Dec. 13, at the Electrical Development League luncheon in the Palace Hotel and were requested to get together and take possession of a table at the meeting.

The future existence of the Electric Transportation Association was discussed, and it was proposed that a meeting be scheduled for January, 1927, to consider this matter. While no date was actually set it was agreed that a meeting would be held during the second or third week of that month to discuss the future activities of the association.

The entertainment at the meeting was in the capable hands of A. J. Anderson.



Production and transmission department station superintendents of the Utah Power & Light Company taken at their conference held in Salt Lake City Oct. 18-19.

## Personals

S. B. Gregory, Pacific Coast representative of the Arrow Electric Company, with headquarters in San Francisco, visited Los Angeles a short time ago.

William C. Lynch, of the Aluminum Company of America, with headquarters in San Francisco, made a business trip to Los Angeles a short time ago.

H. S. Jones, manager, Robbins & Myers Company, San Francisco, recently left on a trip to the firm's factory in the East.

A. H. Jaeger, sales manager, Leonard Refrigerator Company, Grand Rapids, Mich., has been made secretary of the company in addition to his present position. Mr. Jaeger was for four years manager of the appliance division of the Edison Electric Appliance Company, and early in his career he was branch manager of the Holabird Wholesale Company, Seattle.

Melvin E. Lanning, Denver representative of the Westinghouse Electric & Manufacturing Company, recently returned to that city from Boise, Idaho, where he had been supervising an extensive electric range campaign.

Frank A. Leach, Jr., vice-president and general manager, Pacific Gas and Electric Company, San Francisco, recently paid a visit to Sacramento, Calif., where he conferred with E. W. Florence, division manager, and inspected some of the company's properties.

S. V. Walton, formerly manager of the home department, Great Western Power Company, with headquarters in San Francisco, has been made sales engineer of the company's Oakland division, with headquarters in that city.

N. E. Curtice, chief engineer of the Southern California Telephone Company, Los Angeles, has resigned to accept a position with the National Telephone Company of Spain. His new work will deal with toll and telegraph engineering.

F. E. Dellinger, overhead electrical engineer, Los Angeles Gas & Electric Corporation, delivered an illustrated address on "The Electric Meter" before a recent meeting of the members of that company's Employees' Association.

T. R. Smith, junior engineer, in charge of hydrography for the U. S. Bureau of Reclamation at American Falls dam, has been transferred to the bureau's Denver office.

L. J. Burke, who has been secretary to W. H. McGrath, vice-president of the Puget Sound Power & Light Company, Seattle, has been appointed assistant to the vice-president.

B. B. Stith and Harry Bray, of the Western States Gas & Electric Company, Stockton, Calif., attended the recent auditor's convention in Pittsburgh, Pa.

W. D. McElhinney, vice-president in charge of sales for Copeland Products, Inc., Detroit, recently paid a brief visit to San Francisco where he conferred with Listenwaller & Gough, the company's representative in California and Nevada.

Carl B. Luscombe, formerly manager of the western division of the Public Service Company of Colorado with headquarters at Boulder, Colo., now is assistant manager and general superintendent of the Grand Junction Electric & Gas Manufacturing Company and the Grand River Valley Railway Company, properties recently purchased by the Doherty interests. His headquarters are at Grand Junction, Colo. Mr. Luscombe attended Stanford University for two years and was graduated from the electrical engineering department of the University of Missouri in 1912. He became a cadet engineer in the Doherty Training School at Denver and after completing



CARL B. LUSCOMBE

the course was sent to St. Joseph, Mo., as an engineer with the Doherty interests there. He left his duties there for war service, becoming a first lieutenant in the engineering corps and serving overseas. Upon his return he went back to St. Joseph. After brief service he was transferred to Cheyenne, Wyo., as manager of the Cheyenne Light, Fuel & Power Company. Two years later he went to Boulder as superintendent of the western division of the Public Service Company of Colorado and assistant to Charles A. Semrad, general manager. Upon the promotion of the latter in September, 1924, to become vice-president and commercial manager of the company, Mr. Luscombe ascended to the vacancy at Boulder. Frank Henderson, formerly local manager at Boulder, has succeeded Mr. Luscombe as division manager at that point.

W. D. Shannon, general superintendent, division of construction and engineering, Stone & Webster, Inc., Seattle, recently gave an illustrated talk on the Baker River hydroelectric plant of the Puget Sound Power & Light Company before the Western Washington Section of the American Society of Civil Engineers.

B. A. Tracy, who has been connected with the El Dorado plant of the Western States Gas & Electric Company, Stockton, Calif., since it was first put into operation, has resigned to take a position with the Northwestern Power & Light Company, Port Angeles, Wash.

D. C. Green, vice-president and general manager of the Utah Power & Light Company, recently returned from an extended business trip to New York and other eastern points.

E. H. Adams, comptroller, B. C. Electric Railway Company, Ltd., Vancouver, recently made a trip to Honolulu.

W. R. Alberger, vice-president of the Key System Transit Company, Oakland, has returned from a trip through the East, during which he attended the convention of the American Electric Railway Association at Cleveland.

Arthur S. Merrill, general sales manager, Appleton Electric Company, with headquarters in Chicago, recently spent a short time in Los Angeles.

C. J. White, Western representative of the Tork Clock Company, returned not long ago to Los Angeles from a trip to the company's factory in New York.

A. E. Wishon, vice-president and general manager, San Joaquin Light & Power Company, was among the guests at a recent meeting of the San Francisco Electrical Development League.

General John Biddle, U.S.A., retired, and chairman of the board of army engineers that reported on San Francisco's Hetch Hetchy project in 1910, recently visited San Francisco and made a tour of the local units of the water supply system under the guidance of M. M. O'Shaughnessy.

J. D. Farrell, president, Seattle Lighting Company, has been appointed to the board of regents of the University of Washington.

H. G. Spencer, of the electric distribution department of the Los Angeles Gas & Electric Corporation, recently celebrated his twenty-fourth anniversary as an employee of that company.

R. E. Cunningham, of Farnham & Cunningham, Los Angeles, paid a visit to San Francisco a short while ago.

C. M. Teats, Pacific Coast representative of the Consolidated Lamp & Glass Company, Coraopolis, Pa., recently spent some time in San Francisco en route from the Northwest. Mr. Teats formerly was Los Angeles branch manager for Moe-Bridges Company.

J. H. Waterbury, for six years in the engineering department of the National Lamp Works of the General Electric Company, has joined the organization of the Benjamin Electric Manufacturing Company, Chicago, and will be in charge of its engineering department.

Frank Parish, of the Fobes Supply Company, Seattle, has returned from an extended tour of Alaska.

Frank A. Ketcham, vice-president of the Graybar Electric Company, New York office, recently spent a few days in Seattle. He was making a tour of his company's branches on the Pacific Coast.

H. P. Dockstader, who has been a statistical assistant in the Denver office of the Public Service Company, has been transferred to Grand Junction, Colo., as local new business manager in charge of gas and electric sales for the Grand Junction Electric & Gas Manufacturing Company.

C. V. Snow, formerly with the Electric Appliance Company and later with the Electric Corporation, both of San Francisco, has become manager of the lamp department of the Wholesale Electric Company in that city.

W. S. Etheridge, formerly of the Hamilton Beach Manufacturing Company, Racine, Wis., has been made sales manager of the electrical division of the American Flyer Manufacturing Company of Chicago. Mr. Etheridge was at one time in his career assistant sales manager of the Edison Electric Appliance Company.

**Merritt E. Bailey**, formerly of Minneapolis, has been made manager of the sales offices of the W. B. Foshay Company recently opened in Denver. **C. H. Burnworth**, formerly of the Lumbermen's Trust Company, Portland, Ore., is in charge of the company's office in that city.

**W. N. Beatty**, of the legal department of the Utah Power & Light Company, Salt Lake City, attended the convention of the Western States Taxpayers' Association held recently in Los Angeles.

**L. M. Cargo**, division manager of the Westinghouse Electric & Manufacturing Company, Denver, recently attended the division managers' meeting at St. Louis. Following the meeting he visited the company's plant at East Pittsburgh.

**J. D. Davidson**, manager of the electrical department, Hendrie & Bolthoff Manufacturing & Supply Company, Denver, has returned from a business trip to Greeley, Colo.

**Phillip J. Noerager**, who has served the California Railroad Commission for the last thirteen and a half years as assistant engineer, has resigned to enter the insurance field with one of the large life companies. Mr. Noerager was in charge of electric power line inspection from 1913 to 1917, and afterwards was an assistant engineer in the hydraulic division and later in the auto stage and truck division.

**Arthur Vieau** and **Ernest Granzow**, Crouse-Hinds representatives from Minneapolis, were in Denver recently in the interest of their company.

**Walter E. Potter**, special representative of the National Lamb Works, with headquarters at Seattle, Wash., was a recent Salt Lake visitor.

**B. E. Rowley**, of the Edison Electric Appliance Company, Salt Lake City, returned from a business trip in Idaho not long ago.

**J. H. Warden**, of the El Paso Electric Company, recently returned from Los Angeles where he spent several days on company business.

**J. H. Hood**, construction manager for Stone & Webster, Inc., Boston, visited El Paso, Texas, not long ago.

**Lansing S. Thorne**, general superintendent of railways, El Paso Electric Company, attended the recent district convention of Kiwanis Clubs held in Bisbee, Ariz.

**L. G. Marshall** has been made assistant power and lighting engineer in the sales department of the El Paso Electric Company. Mr. Marshall formerly was in the Boston office of Stone & Webster, Inc.

**N. C. Grover**, chief hydraulic engineer of the U. S. Geological Survey, was a recent visitor at American Falls dam.

**William Watson**, works manager, Allis-Chalmers Manufacturing Company, Milwaukee, Wis., a short time ago made an inspection tour through the Northwest and Pacific Coast territories.

**H. F. McPhail**, electrical engineer in the Denver office of the U. S. Bureau of Reclamation, made a study recently of the proposed pumping site at Shell Rock Point of the bureau's Okanogan project.

**C. C. Cragin**, general manager of the Salt River Valley Water Users' Association, Phoenix, Ariz., made a trip to Washington, D. C., a short time ago in connection with a proposed contract for the sale of power.

**C. C. Hillis**, for the past three years president and treasurer of the Electric Appliance Company, San Francisco, has been elected vice-president of Allied Industries, Inc., of San Francisco, Los Angeles, Oakland, Seattle and Portland. Prominent for many years in the electrical industry on the Pacific Coast, Mr. Hillis has been very active in its affairs and has served it in many different capacities. He has been interested particularly in the Pacific Division of the Electrical Supply Jobbers' Association, having served both as chairman and on the board of executives. Mr. Hillis was one of the pioneers in the California Electrical Co-operative Campaign, now the California Electrical Bureau, and



C. C. HILLIS

was formerly a member of its advisory council. Another organization to which Mr. Hillis has devoted much time and attention is the National Electrical Credit Association, of which he has been president twice and on whose board of directors he has served for many years. Aside from his business activities, he is keenly interested in golf and has won many trophies.

**F. R. Ryan**, formerly president and manager of the Morgan Electric Light & Power Company, Morgan, Utah, is the new owner of the North Branch Electric Works, North Branch, Mich. Mr. Ryan sold the Morgan plant a year ago.

**M. T. Crawford**, superintendent of distribution, Puget Sound Power & Light Company, Seattle, recently returned from a business trip which included Chicago, St. Louis and Minneapolis.

**Ray S. Quick**, of the engineering staff of the Pelton Water Wheel Company, San Francisco, was among those who witnessed the testing of some new gate valves recently installed at the El Dorado plant of the Western States Gas & Electric Company, Stockton, Calif.

**Thomas A. Edison** recently was awarded a gold telegraph key by the Lackawanna Railroad as the winner in a contest between "old-time" telegraph operators on a special train between Hoboken and New Village, N. J.

**J. F. Partridge**, engineer for the California Oregon Power Company, conferred not long ago with **H. K. Smith**, hydrographer, Klamath project, U. S. Bureau of Reclamation, in regard to the control of Upper Klamath Lake.

**Harry Byrne**, president of the North Coast Electric Company, Seattle, is on a business trip East. He is expected home before the first of the year.

**E. C. Denning**, electrical contracting engineer, has established offices at 821 Third Avenue, Seattle. He will specialize in power and light contracts and maintenance.

**Ray Robinson**, manager of the Robinson Sales & Service Company, Seattle, recently returned to that city following a business trip to New York City and other eastern centers.

**Robert Miller**, Denver district manager of the General Electric Company, has returned from an executives' meeting in Schenectady, N. Y.

**E. J. Ludeman**, formerly chief clerk at Kelso, Wash., for the Puget Sound Power & Light Company, Seattle, has been transferred to the sales department of the company at Chehalis, Wash.

**John McCarty**, formerly service man at Chehalis, Wash., for the Puget Sound Power & Light Company, Seattle, has been promoted to the position of local agent for the company at Tenino, Wash.

**Max Beals**, formerly chief clerk at Prosser, Wash., for the Pacific Power & Light Company, Portland, has been transferred to the sales department of the company at Hood River, Ore.

**Herbert Spiegelberg**, formerly agent at White Bluffs, Wash., for the Pacific Power & Light Company, Portland, has been promoted to the position of chief clerk for the company at Prosser, Wash.

**G. F. Fishback** of Olympia, Wash., was the winner of the watch offered by **A. W. Leonard**, president, Puget Sound Power & Light Company, Seattle, in the company's recent electric range campaign. Mr. Fishback sold 215 per cent of his quota. **Leslie T. Clawson**, sales agent at Montesano, won the second prize.

**Col. H. G. Winsor**, personnel officer, and **Henry Worthen**, safety engineer, respectively, of the Puget Sound Power & Light Company, Seattle, recently visited the company's Bellingham offices in connection with the company's insurance and pension plan for its employees.

**Lyman Chitty**, formerly in the engineering department of the Puget Sound Power & Light Company's southern district, has been transferred to the eastern district's engineering department.

**Ralph A. Hopkins**, manager central station division, Westinghouse Electric & Manufacturing Company, Los Angeles, presided at a recent meeting of the Electric Club in that city.

**D. G. Kendall**, one of the directors of Brown & Pengilly, Inc., has been placed in charge of engineering and sales for the company's northern division, with headquarters in San Francisco.

## Obituary

**Alves Dixon**, manager of the Baton Rouge Electric Company, Baton Rouge, La., and prior to that general superintendent of railways for the El Paso Electric Company, died Oct. 30 in El Paso. Mr. Dixon had been connected with the latter company for twenty-one years.

## TRADE NOTES

Kelvinator Division of the Electric Refrigeration Corporation, 2051 West Fort Street, Detroit, has placed on the market a buffet Kelvinator, which it describes as a man's refrigerator. This new model is an innovation in the field of electric refrigeration inasmuch as it takes electric refrigeration out of the kitchen into the office, den or dining-room, the company announces. This is a cabinet Kelvinator specially designed for entertaining. It has a storage capacity of 4.4 cu.ft. with extra ice cube capacity. It is offered in three exterior finishes, straight grain walnut, figured walnut and mahogany, with statuary bronze hardware. Each model carries a dial lock of the "safe" type. The interior is finished with white porcelain or Armco iron.

The Electric Material Company, 589 Howard Street, San Francisco, and 443½ E. Third Street, Los Angeles, and the Harrison Sales Company, Sales Terminal Building, Seattle, have been appointed Pacific Coast representatives of the Edwin L. Wiegand Company, 422 First Avenue, Pittsburgh.

Coast Electric Company is the name of a newly formed electrical jobbing concern, which has been established at 952 Folsom Street, San Francisco, by Harry C. Herning and Eugene P. Schaefer, formerly of the Wholesale Electric Company of that city.

The Heine Boiler Company, St. Louis, has published Volume 2, No. 13, of its "Safety Valve" for August, September and October. This number contains a discussion of the Heine VX type boilers.

Ohio Brass Company, Mansfield, Ohio, has announced that its Los Angeles office now is located in Room 508 Subway Terminal Building, 417 South Hill Street.

The Timken Roller Bearing Company, Canton, Ohio, had an attractive exhibit at the National Machine Tool Exposition held at Chicago recently. The exhibit comprised a display of Timken bearings ranging in size from the small washing machine and generator bearing 1 in. in diameter up to the large steel mill bearing 24 in. across, and a miniature model of the Timken steel plant. A feature of the exhibit was the four Timken rollers which were placed on a cone of a Timken bearing and continually revolved around the cone without any visible cause. This effect was produced by four revolving magnets one for each roller, that were concealed beneath the table on which the device was placed. As the magnets revolved, driven by a small electric motor, the rollers were automatically pulled around the cone.

Clapp & La Moree, 314 East Fourth Street, Los Angeles, have announced that they are representing the American Circular Loom Company, 90 West Street, New York, and are handling that company's Red Seal armored cable and flexible conduits and Xduct and Electroduct rigid steel conduit.

The Dover Manufacturing Company, Dover, Ohio, recently has announced new insured No-Burn-Out table percolators and percolator sets. The maker claims they meet every phase of the growing demand for practical daily-use percolators and sets for every home. The percolators come in two models, plain and paneled, each in two sizes, 6-cup and 9-cup. The percolator set includes serving tray, sugar and creamer, and, the manufacturer states, offers a complete superior quality line and a low attractive price range. The Dover insurance policy is packed with each percolator and percolator set.

Harvey Hubbell, Inc., Bridgeport, Conn., announces a new line of Hubbell rectangular outlets with Bakelite screwless plates. This new and attractive design for wall outlets has been developed without modifying the standard T-Slot construction, and any form of bladed cap may be used with it. The screwless plate of Bakelite is snapped firmly into position by the pressure of the fingers—no tools are required. When necessary it may be readily removed for the purpose of painting or papering, without disturbing the position of the switch.

The Okonite Company and the Okonite-Callender Cable Company, Inc., Passaic, N. J., have prepared for issuance to the electric light and power industry a booklet on "Tree Wire." The pamphlet tells why tree wire is needed, how it is used and contains numerous excellent photographs of tree-wire installations.

Roach Appleton Manufacturing Company, 3440 North Kimball Avenue, Chicago, has appointed Walter S. Sweet, 312 Omar Street, Los Angeles, to represent its line in southern California. The company announces that it will continue to maintain a liberal and complete warehouse stock of "Raco" boxes and hangers at that address.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, recently has issued Leaflet L 20291 in which it has discussed the Universal Wemco C insulating oil used for all oil-insulated apparatus, including transformers, oil circuit breakers, induction feed regulators and similar equipment, and which does away with the necessity of carrying different kinds of oil. A general discussion, and descriptions in particular on dielectric strength, viscosity, pour test, moisture, chemical reaction, flash and fire points and other features are included in this leaflet. It may be had upon request at any of the district offices of the Westinghouse company or from the publicity department at East Pittsburgh, Pa.

Allied Industries, Inc., 455 Second Street, San Francisco, which represents the Collyer Insulated Wire Company, Pawtucket, R. I., has had prepared for distribution to the salesmen of jobbers handling its line a compact leather sample case showing the Collyer products. Some of the other companies represented by Allied Industries on the Pacific Coast include the Youngstown Sheet & Tube Company, Tubular Woven Fabric Company, Trumbull-Vanderpool Electric Manufacturing Company and General Porcelain Company.

Electric Household Utilities Corporation, 22nd Street and 54th Avenue, Chicago, recently issued Bulletin No. 2 on its new washing machines, Thor No. 6 and No. 8, and its No. 30 folding ironer, setting forth the advantages of the new models and the details of mechanical construction. The company also has issued attractive broadsides in color describing both devices.

Harry M. Perry, 702 North Main Street, Los Angeles, has issued a pamphlet on "The Belt-Slacker," which, he claims, is a correctly designed and carefully built short slack belt drive. Illustrations are given of types for different positions, and there is much pulley horsepower information and other data of value to the engineer.



Looks like Friday afternoon in the little old red schoolhouse when the little girls brought their dollies and spoke "pieces," doesn't it? But it isn't. It's a "kid party," one of the get-together meetings of the Women's Information Committee of the Public Service Company, Denver.



# Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity  
IN THE ELEVEN WESTERN STATES



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Meadows  
Manufacturing Co.,  
Bloomington, Illinois

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**PACIFIC STATES  
ELECTRIC COMPANY**

*Merchandise Distributor*  
**GENERAL ELECTRIC**



# Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

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IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

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## Interpreting Reader Interest

INTERPRETING the characteristics of the readers of its publications to industry and finance is one of the tasks to which the McGraw-Hill Publishing Company is devoting considerable time, effort and money. For two years full-page advertisements have been carried each month in the leading newspapers in the financial and industrial centers of the country. These advertisements have been institutional in that they have brought forth a concrete conception of the organization that is behind the editorial and advertising reader interest of the subscribers to this and other McGraw-Hill papers.

Briefly, this organization consists of 108 staff editors, drawn from industry and trade to study and interpret the industry their papers serve. They are located in nine strategic centers and travel more than 700,000 miles per year. In addition 3,000 or more industrial specialists regularly contribute to the columns of the McGraw-Hill papers on problems and developments of their special fields. A staff of 467 special news correspondents rounds out this editorial picture.

Advertising reader interest is backed up by 105 advertising salesmen whose first function is to advise on marketing problems and interpret buying habits and buying problems. Behind these are 56 seasoned advertising planners, writers and artists trained in the appeals and mechanics of industrial advertising.

Just how and why this organization functions has been the subject of the series of advertisements mentioned above. On pages 8 and 9 of this issue is another one of this interesting series.

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Wishes every Electrical Contractor in the World  
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The Tubular Woven Fabric Company and their Electrical Jobbers  
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305 Ninth St., Oakland 53 Fourth St., Portland



# EDITORIAL

## Speaking About Electrical West

THIS is the last issue of the Journal of Electricity as such, and on Jan. 1 next, Electrical West makes its first appearance. Judging by the many letters that have come to this office since the preliminary announcement of the change was made, the choice of the name has met with instant acceptance.

A change of name for a publication such as this, and especially in view of the fact that the Journal of Electricity has a background of service to the electrical industry of more than thirty years, should be preceded by prayer and fasting. One may do no more than theorize as to the efficacy of such a change, and, in the final analysis, the case rests with a jury of 6,000 readers. The best logicians in the world frequently find themselves entirely wrong, because, perhaps, they know more about logic than humanity.

This makes the many commendatory letters concerning Electrical West all the more gratifying, and incidentally relieves the anxiety of the publishers, who feel inspired to greater and greater efforts to make good the promise conveyed of a bigger and better journalistic service through Electrical West than was possible with its predecessor, the Journal of Electricity.

As an earnest of its sincerity, the McGraw-Hill Publishing Company has authorized the purchase and installation of additional mechanical equipment, by which twice the flexibility in the selection of the typographical make-up of Electrical West will be available, so that the reading of its pages will be made easier, with less eyestrain and need for concentration.

The world moves fast. Those who do not keep up with the procession will be left behind, and it is the desire of the publishers that Electrical West shall always be abreast of the times and worthy of the progress of the industry in the district it serves.

## Will Congress Pass the Boulder Canyon Bill?

IRRESPECTIVE of the action the sixty-ninth Congress takes upon income taxes, immigration, radio control or any of the other highly controversial questions facing it, the Western states, and particularly those seven comprising the Colorado River Basin, will be interested chiefly in the fate of the Swing-Johnson Bill. In its amended form this measure provides for the appropriation of approximately \$125,000,000 for the construction of a high dam at Boulder Canyon for the purpose of

providing flood control, irrigation and power development. It is understood to have the backing of the administration but it is bitterly opposed by Arizona and certain of the upper basin states.

Like practically every other phase of the Colorado River question, the Swing-Johnson Bill is the focus of a mass of political bickering, sectional jealousy and emotionalism. On another page of this issue an Arizona engineer sets down some of the objections of Arizona to the measure. To be beneficial to that state any dam on the Colorado River must back water up to el. 1,800. Because it does not do this the Boulder dam is construed to be chiefly for the benefit of California. Certainly this is a logical objection.

Moreover, a Boulder Canyon dam hardly will meet the needs of the Imperial Valley irrigationalists whose chief interest in the bill is flood control. From five to six years would be required before such a dam would give any measure of protection to this district. A report is now current that a flood of 72,000 sec.-ft. would prove disastrous. Certain interests in the Imperial section now have withdrawn their support from the Swing-Johnson Bill in favor of an emergency appropriation to provide flood protection. Seemingly this will be required, irrespective of whether the Boulder dam is constructed or not.

In the face of the mass of conflicting interests, it is to be hoped that Congress delays action on this measure. The brief evidence submitted here is sufficient to prove that a dam at Boulder Canyon is not the answer to the situation. Legislation that would pave the way to amicable agreement between the many parties whose interests conflict is much more desirable.

## Industry Must Build Load Faster Than Normal Growth

FOR lack of a better yardstick it is customary to use the average annual kilowatt-hour sales per residential consumer as a measure of the effectiveness of load-building among this class of customers. On another page of this issue the general sales manager of one of the Northwest utilities cites figures for several central stations in that territory that show results almost double the national average of 365 kw-hr. per year. His own company showed a growth in average residential consumption from 245 kw-hr. in 1918 to 630 kw-hr. in 1926 or an increase of two and one-half times. A second company has an average of 656 kw-hr. per residential consumer per year exclusive of flat rate water-heating.

While these records of themselves are imposing, what the industry is interested in learning is how they were achieved. To use the words of the writer of the article they are the result of a more or less sustained effort to build load faster than normal growth and are not due to natural growth of the use of electricity in the home. Rates are not abnormally low; electric ranges and water heaters are not of themselves entirely responsible. Better standards of illumination consistently sold, and the continuous effort put behind the sale of all classes of current-consuming devices, including ranges and water heaters, are directly responsible. Nor was it done by the delegation of the job to someone else. The companies in question accepted the responsibility of building load faster than normal growth and went into the field with specially trained and schooled selling organizations. Co-operation from other branches of the industry was desired and was accepted. Moreover, the feeling is unanimous that all branches have shared together in the benefits.

If one were to ask if these companies were satisfied with present results, the answer would be an emphatic no. The present goal is 1,000 kw-hr. per domestic consumer per annum, and this goal is to be achieved by redoubled efforts to build load faster than normal growth. Companies whose records show an annual residential consumption approximating the national average will find that they have a fine mark to shoot at when they see the need for commercial policies that will assure the building of load and load factor at a rate greater than normal and at the same time in keeping with the growth of the investment in utilities and the conveniences of their customers.

#### **Federal Power Commission's Annual Appeal Still Is Unanswered**

**I**N one breath the sixth annual report of the Federal Power Commission, just issued, announces that during the last fiscal year construction was started on twenty new projects which will have, when completed, an installation of 1,220,000 hp. or 40 per cent of the total placed under construction during the preceding five years. And to counteract that remarkable record in the next breath the report declares that the work of the commission, considered from the standpoint of applications pending upon which it has been unable to take action, is not satisfactory.

To prove this point the report presents a mass of evidence which, briefly summarized, resolves itself into the following: When the commission was organized in 1920 the departments of War, Interior and Agriculture made temporary assignments of personnel in the expectation that Congress immediately would pass such legislation as would permit the commission to employ its own personnel. Despite the enormous increase in the volume of work the commission has today only two more people on its staff than the force temporarily supplied in 1920. Its appropriations have been reduced from \$100,000 in 1921 to \$33,400 for the current fiscal year. The aggregate expenditure since organization has been approximately \$145,500 per year, largely

met from the appropriations of those departments whose personnel is engaged temporarily in commission work. On the other hand the commission has collected from licensees annual charges aggregating \$1,127,000 for seven years, including an estimate for the fiscal year 1927, or more than enough to meet all expenditures since the passage of the act.

This story is not new. In all of its annual reports the commission has appealed for legislation that would give it sufficient finances to employ its own personnel and at the same time permit more adequate administration of the Federal Water Power Act. The evidence presented in the report indicates that even at present the work of the commission is self-supporting and that if greater leeway were afforded additional money would be collected from the use of government lands and other properties.

From the standpoint of the government, of the commission, of the electrical industry and of the public the situation is one that warrants attention and correction. For the government it will mean increased revenues and a better administration of the law. For the commission it will mean freedom from dependence upon other government departments and the ability to keep up with the amount of business presented to it. From the standpoint of the electrical industry there will be less delay in the action upon permits and licenses. For the public it will mean a continuance of a policy that has safeguarded large investments and eliminated speculation from the development of the country's hydroelectric resources.

#### **The Apartment House a Hotbed for Prospects**

**A** COMPARATIVELY small item elsewhere in this issue records the results achieved in one phase of the commercial activities of the two central-station companies serving Portland—that of electrifying new apartment houses. To have equipped 89 per cent of the 1,362 apartments put in service in the first nine months of this year with electric ranges, and 63 per cent with electric refrigerators would seem to indicate a fairly satisfactory result of consistent sales effort, because, of course, 1,210 ranges and 856 refrigerators were not sold without effort. The significant fact about the range installations is that they were sold in competition with a gas company which is noted for many things, but not for complacent passivity when it comes to letting business get away from it. This fact points to the conclusion that the pioneering of electric ranges in that city has borne fruit, and that now when a landlord thinks of modern equipment he thinks of electricity instead of gas—a situation highly desirable to the electrical industry in any community.

Even though it may be assumed that the landlord's acquaintance with the electric range was an influence in his purchase of the refrigerators, nevertheless it will be agreed that to secure a saturation of 63 per cent in refrigeration was the greater accomplishment of the two. Here is an appliance that has not been pioneered to any extent in the Northwest and has gained little prestige in com-

parison to the electric range, and yet more than 70 per cent of the range purchasers elected also to equip with electric refrigeration. Truly in this field lay the real sales achievement, and doubtless beneficial results beyond those immediately apparent will be forthcoming.

Sales executives repeatedly have pointed out that sales of ranges to apartment houses have been a great stimulus to individual domestic sales. Many of the apartment dwellers of today are the homeowners of tomorrow, and, having been educated to the joys of electric cooking in their apartments, and thus having had some of the sales resistance overcome, they have been eager buyers of electric ranges for their new homes. These same executives that have noted the favorable influence of the use of electric ranges in apartments on the sale of ranges to home-owners expect a similar influence to be felt in the case of electric refrigeration and look forward to satisfactory results in this field from the fact that so many Portland apartment dwellers now are being educated to what electric refrigeration will do for them.

Other power companies may take a tip from this line of reasoning and recognize in each apartment equipped with ranges or refrigerators or both a potential hotbed of future prospects who, when they get ready to buy or build, already will possess the desire to own the kind of appliances furnished for their use in their apartments. Thus each apartment equipped is a two-fold benefit to the company and might well merit extra effort on the part of the commercial department to land such business.

#### Coincidence or Is the West a Training Ground for Executives?

**A**NNOUNCEMENT elsewhere in this issue to the effect that James B. Black, vice-president and general manager of the Great Western Power Company of California, has been selected to fill the office of vice-president of the Western Power Corporation with headquarters in New York City serves to emphasize further an interesting state of affairs to which attention has been directed in these columns before.

Horace Greeley's advice to young men seems to have reversed itself, for now the East is reaching toward the land of the setting sun for personnel competent to direct the affairs of great national organizations within the electrical industry.

With 90 per cent of the population of the United States east of the continental divide, it would appear reasonable to suppose that such a preponderance of numbers automatically would set up a surging tide toward the Pacific Coast, rather than that the East, from the top of its great skyscrapers, should peer over the Rockies in search for the man to meet the need of the hour.

Perhaps both premises set forth in the foregoing are right. In the case of the Western Power Corporation, and only a few months ago in that of the General Electric Company with E. O. Shreve, who is now manager of its industrial department at Schenectady, it was the search for the man, where-

ever he might be, and in both cases he was found on the Pacific Coast. Is this a coincidence, and no more, or is there anything about the character of Western electrical development that produces the man when he is wanted?

Easterners smile with goodnatured tolerance whenever it is said that "the West is different," but, isn't it so after all? Where the population is sparse, a good job or a bad job sticks out like a sore thumb. Where there is so much to be done, and so comparatively little of each specialized part, versatility is at a premium, and that is what is needed in an executive. He must be familiar with many things, if he is to direct the labor of others. Perhaps the Pacific Coast is destined to be the training ground for executives, if, in truth, it has not already become so. At any rate, two great national electrical organizations this year alone have taken two of our very best, and our feeling of pride in the recognition that has been accorded to them is tempered with sadness at our great sense of personal loss.

#### Electric Truck Men Demonstrate That All Is Not Over in That Field

**I**F it is said of the electric truck situation that it is slumbering, there are signs at least of a stirring in that sleep. Moreover, such indications are much more encouraging than would be evidence of the death of so necessary a branch of the industry.

Electric transportation has suffered greatly at the hands of the gasoline engine. There is no doubt about it. So firmly fixed in the public mind are the merits of the gasoline machine that to focus attention upon the virtues of electric trucks is an almost superhuman task. The business has never been prosperous enough to justify the tremendous advertising campaign that it would require to put electric trucks on a plane of equality in public acceptance. The only alternatives are a quiet but persistent effort to keep electric trucks sold where they are already in use, to study their values and to spread the good word of their performance wherever possible.

#### And Now—Trained Safety Engineers

**S**ATISFACTORY control of industrial and traffic accidents can be brought about only through the services of trained experts. It is trite, but true, to say that most accidents are easily preventable in the fullest sense of that word. Experiments made by various utilities in placing full-time safety supervisors even on construction jobs have proved beyond doubt the economic desirability of such efforts.

Believing in the efficacy of such a policy the University of New York City has inaugurated a course in safety engineering. It is recruiting students for this course from among industrial executives, insurance inspectors, engineers, transportation directors, and physicians employed by utilities or manufacturing companies, and expects to turn out men well trained along practical lines. Such a step is highly commendable and it is to be hoped that other universities will follow suit.

# DISCUSSION

## Regarding Arizona's Objections to the Boulder Canyon Dam

To the Editor:

Sir: There are certain basic facts upon which to formulate a plan for logical economic development of the Colorado River. The principal ones are the total quantity of water, the amount of land that can reasonably be expected to be irrigated in the entire territory involved, and the physical features of the river, with the deep canyon region separating the upper basin from the lower, each basin having different characteristics and requirements of water.

A business organization controlling the entire situation would not attempt to allocate in advance certain amounts of water to one portion and others to another. It would determine from year to year what projects appeared profitable to develop, and would proceed to develop them, regardless of what proportions were in the upper and lower basins. That is true economic development and the only kind that is best for the most rapid development of the natural resources of the United States.

The average annual reconstructed flow of the Colorado is agreed upon as approximately 20 million-acre ft. At the time the seven-state compact was drafted the needs of each state were tabulated and the water apportioned to the upper and lower basins, there being a surplus to cover the present use in Mexico and about a million and a half acre-ft. over the estimated requirement for each basin.

If these estimates were true and fair, no one in any of the states should object to the division of the water as provided in the Santa Fe Compact. The physical facts have not changed, but our knowledge of them has changed considerably. What is the present situation? Los Angeles has discovered that over a million acre-ft. may be diverted to the coast region for municipal water supply, and is proceeding with the preliminaries of construction.

It has also been found that 600,000 acres in the lower Gila Valley in Arizona can be irrigated by lifting the necessary water 200 ft. The cost of this project is reasonable enough for it to be considered practicable for development in the very near future. This would require about 2,400,000 acre-ft.

These two projects call for over 3,400,000 acre-ft. per annum, for which no account was made in drafting the Santa Fe Compact. With these two projects the entire surplus for the lower basin is used up and an actual deficiency exists.

These developments alone should be enough to prove the utter fallacy of attempting to apportion all or practically all of the water of the Colorado at the present time. I do not feel at liberty to give his name, but the head of one of the major branches of the Department of the Interior has said, and I think the advice is good, "For the present, plans should be made on a conservative basis. The stage of development indicated . . . as of the near future seems to be safe. If the apportionment of water there indicated is not the best, rectify it, but let this remain as the tentative total until excellent basis for some other action is available."

Here I wish to make a constructive suggestion, applicable to the division of water of all other interstate streams as well as the Colorado. If the Santa Fe Compact were ratified and in effect, it would be necessary to have records of all water rights and water diversions in and from the basin in order to adjudicate claims.

This would be necessary because it would be impossible to tell without such records whether water shortages were due to small runoff of water or excessive use in certain parts.

I suggest that the Department of the Interior be authorized to establish the office of water commissioner, collecting records of water appropriations and use from interstate streams as is now done by water commissioners in each individual state.

These records should be assembled in groups covering the stream basins, one being for the Colorado River basin, and

including all the appropriations from the basin in all the seven states. The records should be in full agreement with the records of the same appropriations by state commissioners; taken from state records in the case of past appropriations and made co-ordinately with state records in the case of future appropriations.

The federal water commissioner's jurisdiction need not and should not conflict with that of the individual states. In case of adjudication of claims all within one state, though on an interstate stream, if no other state were involved the state water commissioner would have jurisdiction. Wherever rights in two or more states were involved the federal commissioner would have jurisdiction.

As time goes on the larger and interstate streams come nearer to complete development, and conflicts between interstate claims become more and more frequent. Why not make this the time and the occasion for the establishment of an orderly way to handle the situation?

The Los Angeles water supply and the Parker-Gila Valley projects do not complete the list of possible developments discovered since the compact was formulated. The Arizona Engineering Commission made a preliminary estimate that the lower Gila Valley—600,000 acres—could be irrigated at a cost of \$168 an acre. It also investigated a number of routes for an Arizona high line canal, and made preliminary estimates on one requiring 134 miles of tunnels, 236 miles of main canal and a large regulating reservoir, in addition to a diversion dam and main storage dam, the latter not included in the estimate of cost.

For a project to irrigate two million acres of land, the Arizona Engineering Commission estimated the total cost at practically 450 million dollars, or \$225 per acre. No interest was included.

There are between three and four million acres of land in Arizona to which it is possible to apply water from the Colorado River. Broadly speaking it is physically possible to put a dam anywhere along the river and divert the water by gravity to any lower point. The cost of such a project and the question whether it is a profitable undertaking are the things which determine whether it should be put through.

Among the many plans that are possible one proposed by the writer, which has thus far not been officially investigated, appears to be cheap enough to warrant starting construction in the immediate future. It consists of a dam about 700 ft. high in Marble Gorge, about 40 miles below Lees Ferry, for regulation and diversion of water and for power development, and a tunnel from the dam to a suitable point on the Verde River, fairly close to the center of Arizona. The dam would utilize the same excellent storage basin as the Glen Canyon or Lees Ferry dam.

The tunnel would be about 116 miles long, and the water from it, delivered at about 3,000 ft. above sea level, would flow down the Verde River to its mouth near Phoenix with nearly 2,000 ft. of fall, then some 250 miles along the Salt and Gila Rivers to Yuma and the Gulf of California. Large tracts of fine irrigable land are found on both sides of the latter rivers.

This tunnel, made large enough to irrigate two million acres of land, is estimated to cost about 210 million dollars, or less than half as much as the high line canal aforementioned. Land in Arizona will stand a development cost of a hundred dollars an acre or somewhat more.

Some have questioned if there is enough water in the Colorado to irrigate these two million acres in Arizona. An odd thing about this is the apparent assumption that all feasible projects in other states have a preferred right, perhaps because they were known to be feasible or were listed first.

The record of river flow at Lees Ferry supports my belief that it will ultimately be proven as a fact, that if only the actual needs of all the basin states are considered, there is water enough for all the land in the United States, but not enough for additional land in Mexico.

Reference to the Fall-Davis report and to testimony given in the Congressional Record of Jan. 31, 1923, will disclose that the estimate of water for the upper basin states included not only the projects now becoming feasible and expected to become feasible in both near and distant future, but also those so expensive that their development could not be foreseen at all, and 100 per cent of the unirrigated land within present projects and of possible extensions.

To illustrate, the Congressional Record above referred to, page 2814, shows that 317,000 acre-ft. was estimated for additional diversion to lands outside the Colorado River basin, and Mr. A. P. Davis says, "The only one that can be reasonably included as at all probable . . . would be



110,000 acre-ft. for the Denver City water supply. For purposes of computation, however, we have included the entire amount as listed above."

It is a fact that under the compact there is not enough water allotted the lower states to serve all the real needs of California and the recently discovered areas in Arizona. It is foolish to expect California to give up any of her really feasible projects so that land may be irrigated in Arizona when water that in all probability will never be used by the upper states has been "assigned in perpetuity" to them by the compact.

A California-Nevada-Arizona agreement therefore becomes impossible, and inability to ratify the seven-state compact follows. The recent election in Arizona has brought out the fact that sentiment in the state is practically unanimous against the location of the first big storage dam in Boulder or Black Canyon or below.

The reason is a perfectly simple one. Either of these sites is too low for Arizona to utilize any considerable amount of the stored water. To suit Arizona the storage dam must back water up to an elevation of 1,800 ft. or more.

The Swing-Johnson Bill proposes that the Government put up 125 million dollars for river development almost exclusively for the benefit of California. Locating the dam high enough on the river will remove one of Arizona's chief objections to the plan.

The other chief objection is the ability of the land owners in Mexico to appropriate the water stored by a Boulder dam, and the probability that they will do so. Thus far it seems no attempt has been made to safeguard the utilization of the water in the United States. Until this danger is guarded against it is almost certain that Arizona will continue to oppose the Swing-Johnson Bill.

A dam at Marble Gorge would satisfy the requirements of California, Nevada and Arizona. It would store the flood waters as effectively and protect the Imperial Valley and other low land just as successfully as a Boulder dam, and so also would provide additional water for irrigation. It would be just as well suited as Boulder for the Los Angeles water supply, which is to be taken from the river bed many miles below either dam site.

It would provide sufficient power for the needs of California, Nevada and Arizona for years to come, and lastly will store the water high enough that Arizona can use it by any plan that may be devised. Only one real objection can logically be raised against putting a dam in Marble Gorge, and that is not a major consideration. It is that the power would have to be transmitted farther to reach the California markets.

There is plenty of the power only waiting to be developed. No state needs to worry about an allotment of power. Nevada users would be able to tap a line from Marble Gorge to California about as conveniently as the power plant at Boulder. Arizona's present need of power is relatively greater than is realized, being probably about 100,000 hp.

The Swing-Johnson Bill is to become effective upon ratification of a six-state compact. Can six states divide up the resources of seven, without the consent of the seventh? If so, then two could divide up the resources of three and compacts would become very popular.

Congressman Hayden (now senator-elect) of Arizona told the Congress at its last session that if Arizona is ignored in the passage of the Swing-Johnson Bill she will take the matter to court—the very thing which compacts are supposed to prevent. It is with the greatest regret that I see the matter drifting as it is. I have been keenly interested in Colorado River development for years and have given it a great deal of study. The only way I can see in which the construction of a combined flood control and power dam such as Boulder can go forward unimpeded by interminable bickering and lawsuits is to provide definitely for the following two important features:

- 1—For the benefit of all the Colorado basin states, provide that Mexican land is to acquire no rights to water made available by this and future construction in the United States.
- 2—Locate the first storage dam where Arizona can benefit from it as well as California and Nevada. The best location for all concerned is the lowest feasible site above the Grand Canyon, probably forty miles below Lees Ferry.

These two things being provided for, the lower states need not settle the division of water. But suppose the upper states still demand a division of water satisfactory to them before any project is started? Another modification can be made that still permits the most essential work. That is

to agree that no additional appropriations for consumptive use of water be made in any of the seven states from the Colorado River until an agreement for division is reached or a policy determined.

This would permit flood prevention and power development work to proceed at once. If the upper states object to building a storage dam strictly for flood prevention and power, with a definite agreement that no consumptive use of water will be made, then they are playing the dog-in-the-manger act, and every one should know it. If all Congressmen and Senators knew this beyond reasonable doubt they would no longer countenance the delay in removing a great flood menace and the beginning of a great constructive development.

The people of Arizona are in deadly earnest in opposing the Boulder Dam, and they are not playing dog-in-the-manger. The land is here, millions of acres, waiting for water. Water is in the river—enough for some two million acres in Arizona, and we know how to get the water onto the land at reasonable cost. Why should California and Nevada insist that the main storage dam be built so low that Arizona cannot use it?

C. C. TILLOTSON, Engineer.

Clarkdale, Ariz.,  
Nov. 26, 1926.

## Room for the Dealer in Refrigerator Business Too

To the Editor:

Sir: Permit me to congratulate you on the excellent resume of conditions in the electrical refrigerator business which appeared in the November first issue. It provides food for thought for anyone interested in the distribution or sale of this equipment. There is one angle of the situation, however, which it seems to me you have overlooked and that is the position of the electrical dealer who would like to carry this appliance and share in the profits to be derived from it. There is a real field for him, it seems to me, particularly in the rural districts where the manufacturer's representatives are not so active.

Of the many dealers who have attempted to stock refrigerators, however, only a few have succeeded and this principally, I believe, for the reason that the refrigerator is not primarily an electrical device. It requires an expert to handle it—and the dealers do not seem willing to take the time to become experts. An instance was reported not long ago of a dealer who was called to service a refrigerator he had sold. A little later he called up the wholesaler from whom it had been purchased originally and asked for help. "I have got the motor running all right," he said, "but the thing won't get cold. I heard a sort of little z-z-z-z-z while I was fixing it. Do you think that has anything to do with it?" He had allowed the entire refrigerant to escape and didn't know it.

The servicing problem is one which is not fully settled from any standpoint. In spite of statements to the effect that servicing on refrigerators costs less than that on any other major electrical appliance, this has not proved to be the case in practice. This means that the margin of profit allowed the dealer has to cover not only the usual items of overhead, but also the expense of keeping the machine in order. Either a wider spread should be allowed, or the servicing should be carried on with some assistance from the manufacturer—or, and this is probably the solution, the public should be educated to pay its own way as it goes.

The electrical industry has unfortunately started off on the wrong foot by giving the public to understand that free servicing on all electrical equipment for at least a year after it is purchased is their right and due. Why should they expect to have the electric range elements replaced, electric washing machines overhauled, electric refrigerators repaired without cost to themselves, when they receive no such additional bonus with their other purchases? When little Johnny pours a kettleful of boiling water over the grand piano, does the music company make good the loss? It does not, nor does the customer expect it. The electrical industry has made its own bed in this regard and it is perhaps its own fault if it finds it uncomfortable. But there seems to be no reason why it should leave things as they are. Why not remake the bed?

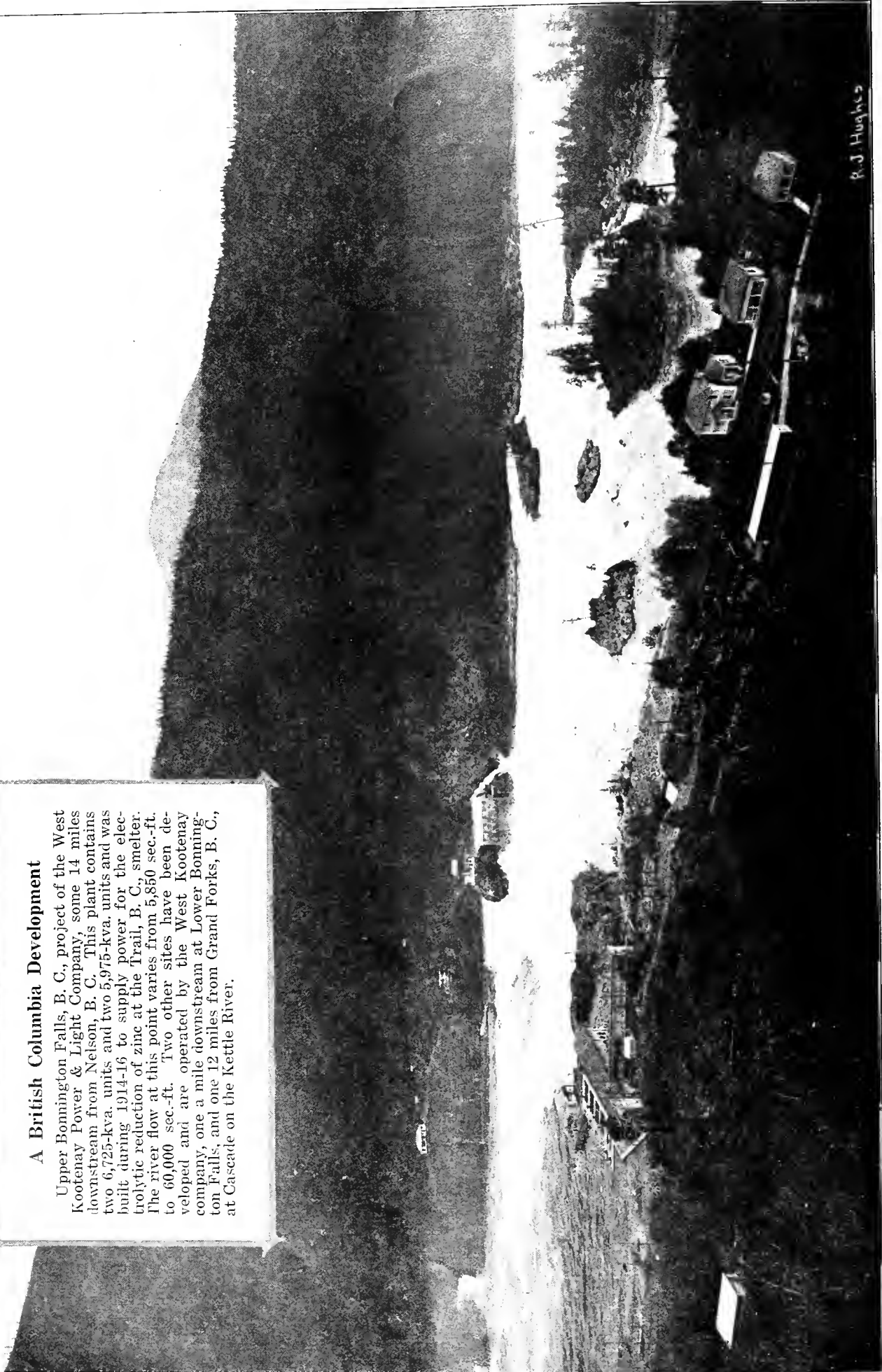
CHARLES GREY.

Oakland Calif.  
Nov. 22, 1926.

### A British Columbia Development

Upper Bonnington Falls, B. C., project of the West Kootenay Power & Light Company, some 14 miles downstream from Nelson, B. C. This plant contains two 6,725-kva. units and two 5,975-kva. units and was built during 1914-16 to supply power for the electrolytic reduction of zinc at the Trail, B. C., smelter. The river flow at this point varies from 5,850 sec.-ft. to 60,000 sec.-ft. Two other sites have been developed and are operated by the West Kootenay company, one a mile downstream at Lower Bonnington Falls, and one 12 miles from Grand Forks, B. C., at Cascade on the Kettle River.

R. J. Hughes



# The Increasing Responsibilities of the Industry's Commercial Departments

By A. C. McMicken\*

General Sales Manager, Portland Electric Power Company, Portland

**E**NGINEERING and financial activities of electric utilities have had the center of the stage for some time past and have earned that position, but the opportunity for the commercial men of our industry to step into the lime light is here. Are we doing so? Are we ready to do so?

The commercial policies and activities of the electric utilities of this country vary greatly. Comparatively speaking, the electric utility commercial or sales organizations are of recent origin. In too many instances, electric utility executives and financiers have had too little sympathy with and understanding of salesmanship and commercial activities as applied to electric utilities. At least, commercial men have been prone to so place the blame. Commercial managers, however, have not always made the most of their opportunities and some of us still do not see the tremendous fields for new business open to us and have made no effort to sell our executives to these possibilities.

We all are not yet awake to the fact that correct and efficient salesmanship requires specialized training and experience just as much as engineering and other technical pursuits. This factor has been largely overlooked in our business.

In many parts of the country, during the war and since, power companies have been so busy keeping up with the demands for electric service made upon them that intensive commercial activities have been deemed unnecessary or undesirable. On the Pacific Coast, due to generally lower rates, to our having sold the electric idea to the public many years ago, and for other reasons, we have no large groups of prospective customers residing in unwired homes or business buildings. We all have been busy



A. C. McMICKEN

believes that one of the responsibilities of the commercial departments is to build load and revenue faster than the normal growth of the industry. Intelligent programs which will sell more kilowatt-hours per kilowatt of installed capacity are the present need of the industry in his opinion.

spending large sums annually in building new and extending old lines and in increasing output, but have we been expending proportionate money and effort in increasing revenues from existing customers of all classes? If we are to take our proper position in the industry, we must build load and revenue faster than the normal growth. Much of the financing of the larger electric utilities was done before the world war when money was comparatively cheap. Many of our rates reflect this fact. Our growth since the war has been phenomenal and the demand for money for extensions, betterments and increasing plant capacity tremendous, all requiring new capital at comparatively high interest rates. This has brought about conditions which make imperative the building of profitable load much more rapidly than at the normal rate of load growth.

It is imperative that we commercial men have a full understanding of the situation and plan carefully and intelligently a program which will sell "more kilowatt-hours per kilowatt of capacity installed." Mr. E. W. Lloyd in a recent address points out that, generally speaking, the very large systems in the country have not improved load factor materially in the last ten years.

The system load factor improves only as the load factors of different classes of customers improve and as new long hour uses for electric service are developed. I quite agree with Mr. Lloyd that most of the credit for selling the idea of electric service and the use of all manner of consuming devices goes to the manufacturers. We have lagged behind and in many instances have been prodded into activity by the manufacturers. Now that we have accepted most of the load building current consuming appliances and devices on the market as desirable both to the customer and to ourselves, what are we doing to put them into service?

\* Excerpts from an address before the Commercial Section, Pacific Coast Electrical Association, Santa Cruz, Calif., Nov. 12, 1926.

I think I can state fairly that in the main we have only scratched the surface. Such load building campaigns as kitchen lighting unit campaigns, store lighting unit campaigns, electric refrigeration campaigns, range campaigns and many others, have been conducted spasmodically and with varying intensity and enthusiasm. In general they have been successful and ultimately profitable, but as an industry we yet have no commercial programs or policies sufficiently projected into the future to assure the building of load and load factor at a rate in keeping with the growth of our investment or the convenience of our customers.

### Many Fields for New Business

Practically all of the load building possibilities obtain here that obtain in any other part of the country. While most of the Pacific Coast cities are not essentially manufacturing cities our electric service recognizes no competitor and our service operates most of the industries. In the main, this load is mostly induction motor load of poor load factor and worse power factor. Have we studied and exhausted all of the possibilities for the use of electric energy by our existing industries? I am sure we have not and that the possibility of adding much non-inductive apparatus is open to us.

I am impressed with the fact that aside from the principal business thoroughfares most of our city streets are inadequately lighted and our highways are not lighted at all. In the motorized age in which we live better lighted streets and highways are imperative; yet but little effort has been made to sell the public and public officials the value and necessity of more and better street lighting. Revenues from street lighting run from seventy cents per capita to approximately three dollars per capita per annum, with most of us in the seventy or eight-cent class. For some unknown reason, promoting street and highway lighting is generally considered undignified, unethical or dangerous, or all three.

Residential load factors are generally poor, although they average higher on the Pacific Coast than anywhere else, and residential business is recognized here at least as desirable and profitable business. As our residential customers far outnumber all other classes combined, they offer the greatest field for increasing revenue and load factor.

That the national average of one kilowatt-hour per day, or 365 kw-hr. per year per residential customer, can be profitably built to much higher levels is proven by the records of the utility I represent and by other utilities in the Northwest with which I am familiar. For the year 1918 the average consumption of all our residential customers was 245 kw-hr. per annum. For the year 1925, that average had increased to 558 kw-hr. per annum, and will probably run approximately 630 kw-hr. for the year 1926. This means that the average residential customer in 1926 will use two and one-half times the number of kilowatt-hours used in 1918, and this change has taken place without any change in rates and is due in part to better standards of illumination and in part to the use of current consuming

devices, electric ranges and water heaters. Other companies in the Northwest can present similar figures.

This increase is not due to the natural growth of the use of electricity in the home, but to the more or less sustained effort to build load faster than the normal growth and illustrates in a small way what can be accomplished. No doubt similar records have been made in California and as yet the surface is only scratched, for none of us is yet satisfied with the use of electricity in the home.

Commercial cooking and heating generally has not had the support which this valuable non-inductive load deserves at our hands. Hotels, clubs, restaurants, hospitals and many other institutions can make profitable use of heavy duty cooking and heating devices.

Electric refrigeration now holds the center of the stage and demands our support whether or not its mushroom growth guarantees the best product and the greatest freedom from trouble. Free from troubles and service calls, electric refrigeration offers another splendid residential and commercial load builder.

### Commercial Men Must Take the Lead

It is not my purpose to endeavor to point out all of the possibilities for load building in either the municipal, industrial, commercial or residential fields, but rather to reiterate the call which has been sounded by the National Commercial Section chairmen during the past few years for the commercial men of our industry to take their place in the sun and bring the commercial activities of electric utilities up to the high standard set by our engineers and financial heads. I am one of those who believe that if load is to be built more rapidly than the normal growth, the job cannot be delegated to others, but must be done by us. I fully appreciate the desirability if not the necessity of having the fullest co-operation of every branch of the electrical industry, but I maintain that the lead must be taken by our own commercial organizations. We, with specially trained and schooled selling organizations, must go directly into the field. The job facing us is vital—it is tremendous, and it cannot be dodged nor delegated. One of the utility companies in the Northwest took up the sale of electric ranges but a few years ago, largely because it could get no one to do the job for it. Today this utility has in excess of 16,000 electric ranges on its lines and during the first 10 months of this year sold in excess of 5,600 ranges. I cite this as an example of one type of central station load building, which cannot be delegated. Other Northwest utilities have been proportionately successful in building range load and without exception the utilities of the Northwest are taking the lead in promoting and selling many different load builders, not only to residential consumers, but to industrial and commercial consumers as well. This, they have been able to do generally in co-operation with other branches of the industry, when this co-operation can be had.

Our duties as commercial men are steadily broad-



ening and should embrace much more than the management of "new business departments" organized primarily to contract new light and power business. Specially trained men are required to promote the use of and sell heavy duty cooking appliances, refrigeration, street lighting, industrial heating appliances, better store and residence lighting, electric ranges and water heaters, and this work should not be a side line of the regular light and power sales force.

Merchandising, in my opinion, is a distinct part of electric utility commercial activity. Our merchandise departments as a whole are operated at a loss, but they nevertheless do build load and can be made to build good will. Our aim should always be to merchandise at a profit and to co-operate with electrical and non-electrical merchants and help create a demand for electrical merchandise.

Two of the principal reasons why we fail as merchandisers are that we do not select men trained along merchandising lines to manage such departments and give them the backing necessary to success, and because we merchandise half-heartedly, fearing the criticism of the electrical and non-electrical merchants who wail that we, by merchandising, are robbing them of a living. Experience has clearly demonstrated that an active utility merchandising department actually creates more business for other merchants and a greater demand for all manner of devices and appliances.

#### Power Companies Co-operate with Dealers

The power companies of the Northwest have been extremely liberal in co-operating with the dealers and that both have been successful in selling more appliances is borne out by statements from practically every commercial department executive in this territory. One executive says in this regard:

"It has been our custom to conduct one range campaign a year, usually during the two months of May and June. Everything possible is done to co-operate with the local dealers selling ranges. For example, we handle only one line of ranges. There are other good lines and where it is possible to select a dealer satisfactory to the range manufacturer and to ourselves we have offered to finance that dealer in the sale of electric ranges of a good make. Our financing consists in furnishing him with stock and carrying his paper.

"Further we do not install. All range installations are done by the dealer, whether the range itself is sold by him or by us. When it is sold by us the dealer is paid cash for his installation work and the amount is charged to the customer with his range and is usually paid to us on an installment basis. In one small district the business turned to the dealer in installing ranges sold by the power company amounted to \$6,000 last year. This happened in one of our towns of less than four thousand population; it meant considerable to the dealer.

"I believe it is an actual fact that more electrical merchandise is purchased in territory where central stations are aggressively merchandising than in territories where they are not. We have found dealers profiting greatly by our exploitation

of the appliance field, and doing more business after we became aggressive in merchandising than they did before. In other words, we feel that aggressive central station merchandising creates business and an active dealer can profit greatly when his central station merchandises. The non-aggressive dealers do not profit; that is natural. The opportunity to profit, however, is there. It is common for dealers in our territory to sell more of the devices on which we are campaigning at the time than at any other time during the year.

"We sell all merchandise at list prices where the manufacturer has established a list price. On certain lines of merchandise that do not carry a definite list price we offer specials to our customers at reduced prices. When these offerings are made the dealers are urged to participate with us, in which case we furnish the dealer the goods at our cost and charge a carrying charge for handling the account.

"The history of the commercial lighting campaign is similar. Our activity in developing commercial lighting business has resulted in the creation of a demand for better lighting. We do not continue the sale of commercial lighting units after our campaign period. From that time on all such business is turned over to the dealers. Our function in the lighting field is developing the demand. After this has been done in a satisfactory way we leave it more or less to the dealer to capitalize on.

"I believe similar history could be told of almost any electrical device which is now popular. It requires a development period. The central station surely is well equipped to develop the market on new devices and will profit more than anyone else when it is developed. Nothing could be more valuable to a contractor-dealer than this developmental work. In my opinion contractor-dealers should benefit greatly when the central stations in their territory merchandise aggressively."

The general sales manager of another power company, commenting on the sale of electric appliances by his company, says:

"My own feeling is that if appliance sales are left entirely to the dealers they will supply such devices only upon demand. Our experience has been that they do not put in the effort to sell appliances that we think they should. We have had this experience in several districts where we did no merchandising whatever, and we have felt that in order to develop the business, it was necessary for us to go into it. The results have been that our activity has created such a large demand for appliances that the dealers are doing more business than they did before we went into it."

The merchandising policy of still another of the power companies is reflected in a statement by the sales manager, in which he says:

"There is no doubt in my mind that central stations should merchandise all sorts of current consuming devices. They should use as their pattern successful merchants in other lines. Occasional sales at reduced prices or with special features are just as necessary in our business as in the department store.

"Nearly every month we endeavor to feature

some current consuming device which we are able to buy in quantities and sell to our customers at a reduced price. For example, if a manufacturer changes the design of a heater or is overstocked, we buy all he is willing to sell and circularize our customers with return post cards which act as an order on us to have delivered whatever article we are featuring. This method has resulted in selling thousands of air heaters, waffle irons, toasters, etc., and helps to bring our average kilowatt-hour consumption per residence to 656 per year exclusive of flat rate water heating.

"In the main, all appliances are sold at list and only on range sales, special purchases, or close out, do we deviate from this policy.

"I believe that the power companies should blaze the way in merchandising ethically and invite the dealers to carry on and join with their plans, but do not let them dictate what the policy should be."

The selling efforts of another western utility result in increased sales by dealers in electrical appliances through the territory it serves. "During the campaign periods," says this company, "other electrical and non-electrical merchants profit by our activity and advertising. They have stated in a number of cases, particularly during washing machine campaigns, that they have had a noticeable increase in business, although they were not actively campaigning and advertising themselves. Clean competition is a help to any merchant and I be-

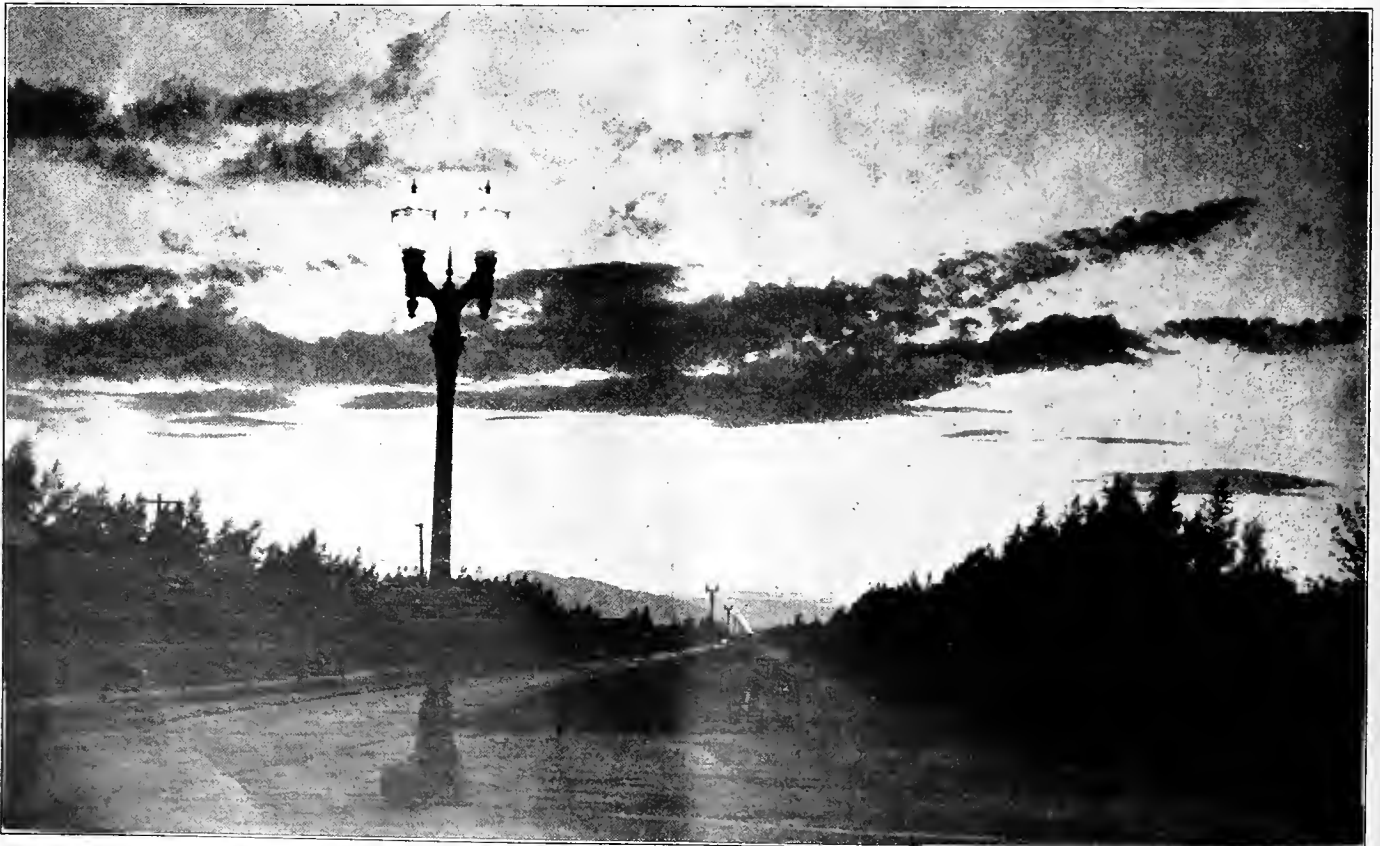
lieve central station merchandising is a help to other merchants of electrical appliances."

Probably the most important factor in increasing the number of kilowatt-hours per kilowatt installed is the rate structure. It seems to me that rates have been left too much to theory and to rate engineers and that we commercial men have had too little to say in rate making. Witness the wide variety of rates in use throughout the country. It is quite possible to frame rates at least fairly understandable by the public, which will bring in the necessary revenues and at the same time encourage our customers to use more kilowatt-hours. Before any elaborate load building programs are undertaken, our rate structures should be studied and we should be sure that they are designed to encourage the use of electricity and not discourage it.

I should like to call your attention to and commend the efforts of the National Commercial Section in bringing about the co-operation of manufacturers and power companies in national appliance selling campaigns. I feel it the duty of the geographical divisions to take an active part in the work of the National Commercial Section and its committees.

Our responsibilities as commercial men to our companies, to the industry and to the public are grave responsibilities and our opportunities are unlimited. May we always be conscious of them and equal to them.

## Higher Standards of Street Lighting for Suburban Districts



Efforts of the industry to increase the standards of street lighting have borne fruit in California. The above photograph shows an installation of Westinghouse equipment in

a suburban section of a southern California city. It is typical of the double luminaire type installation in better residential sections where streets are parked in the center.



Station B of the Portland Electric Power Company at Oregon City, Ore. Part of the equipment has been in service since 1894 and most of it since 1897.

# Western Hydroelectric History

## I—Station B, Portland Electric Power Company

By W. C. Foster

Assistant Operating Engineer, Portland Electric Power Company, Portland, Ore.

**M**ORE than thirty-two years continuous service is the operating record of Station B of the Portland Electric Power Company, one of the oldest hydroelectric generating plants in the entire Pacific Northwest. This plant is located on the Willamette River at Oregon City, about 15 miles south of Portland, Ore. The first three units were put into operation in 1894 and still are operating. They are known as General Electric type TY-20 and originally were rated 450 kw., 3 phase, 6.6 kv., 33 cycles at 200 r.p.m. They are of the revolving-armature type having the three collector rings and copper leaf brushes mounted at the top of the machine. Details of these machines may be gathered from the accompanying illustrations.

Each generator is direct-connected to a 42-in. water wheel and also is connected to a 60-in. water

wheel by means of a 48-in. leather belt. The original exciter machines were 125-kw., 500-volt, vertical d.c. generators, direct-connected to 48-in. water wheels. The scheme of having the two different water wheels attached to each generator was designed to care for fluctuating stream conditions. Normal maximum operating head during low-water periods is about 40 ft. However, under high-water conditions in the Columbia River water is backed up into the Willamette River as far as the Oregon City Falls and to an extent that reduces the operating head on the plant to as low as 20 ft. or even less under extreme conditions. The operating plan was to use the 42-in. wheel on high heads and the 60-in. wheel on low heads.

In 1897 the original power house was extended to accommodate an additional 7 units. Four of these generators, identical to those installed in

1894 with the exception that the operating voltage had been raised to 10 kv., were placed in service in that year. In 1903 two 540-kw., 3-phase, 10-kv., 33-cycle, 143-r.p.m. horizontal machines were installed, each direct-connected to a 51-in. double-runner water wheel. Also about that same time all of the original generators were rewound to change the operating voltage from 6.6 kv. to 10 kv.

During the first nine years of operation of this plant each individual generator was connected through some 15 miles of transmission line to its own particular block of substation apparatus in the Portland substation. This original Portland substation occupied the ground now covered by the Electric Building at Seventh and Alder Streets. At the time that the original generators were rewound for 10-kv. operation, new panels were provided, open knife switches were discarded for oil circuit breakers and arrangements were installed permitting the machines to be paralleled to a common bus within the station. At that time also the exciting system of the station was changed from a 600-volt basis to a 125-volt system supplied by two 85-kw., 125-volt d.c. generators, belt driven from water wheels. The 600-volt d.c. generators thus relieved from excitation service were switched over to electric railway service, serving principally the electric interurban trains operating between Portland and Oregon City.

At still a later date, two 600-volt, d.c., 500-kw. Allis-Chalmers generators were direct-connected to the 60-in. water wheels on two of the original units. These new d.c. generators replaced the old original 600-volt generators initially installed for excitation service and subsequently switched to railway service. For governing and load regulating purposes the 60-in. water wheels thus direct-connected to the two new d.c. generators were left tied in mechanically with the 33-cycle a.c. generators on the corresponding 42-in. wheel through the 48-in. leather belt previously mentioned.

Since these a.c. machines were tied into the station bus, each carrying its proportionate share of the station load, they served to regulate quite definitely the speed of the d.c. units attached to the corresponding 60-in. wheels. This mechanical combination gradually obviated the operating difficulties incident to the sudden increase or decrease of the d.c. railway load. Prior to this arrangement a sudden rejection of load on the railway system permitted the d.c. water wheel-driven generator to run away and quite frequently flash over causing some damage and delay to service. With the mechanical tie arrangement, the sudden rejection of d.c. load is compensated for by the corresponding a.c. generator picking up a greater share of the station a.c. load. In other words, the sum of the loads of the two units tied together is practically a constant quantity. The original 600-volt exciter units were rewound for 125 volts and now are in service supplying part of the excitation load of the station.

This old plant now is looked upon with some curiosity because of its design and the early type of machinery installed. The early operating fea-

tures of this plant offer a most interesting comparison with modern power station operating methods and equipment.

In the early days of the station when the generators were working at 6.6 kv., oil circuit breakers were unknown and 3-pole open knife switches mounted on marble panels served the only means of disconnecting a generator from its transmission line. This was not a particular drawback at that time because, as before noted, each generator supplied its own particular line and its own particular group of substation apparatus at the receiving end of its individual transmission line. Therefore it was not necessary to do any synchronizing because the only tie between generators was on the d.c. side of the rotary converters at the receiving



Fig. 1. Generators No. 1, 2 and 3 at Station B, Portland Electric Power Company, Oregon City, Ore. These 450-kw., revolving-armature machines were placed in service in 1894 and still are delivering kilowatt-hours to the system.

substation. Further than this, switches were not normally operated under load conditions, but served merely as a means of disconnecting a unit from a line and possibly connecting it to some other line for certain emergency conditions. Part of the generators served lighting loads through the substation and part of them served the d.c. system through rotary converters. Consequently the generators were known respectively as "rotary machines" or "lighting machines."

All of the operation was controlled from the substation by means of a telephone and a call-bell system. The call-bell system was a series 500-volt d.c. arrangement including in the circuit the gongs at the generating station and at the substation together with the switches necessary to control the impulses on the line. Various code signals were worked out whereby information regarding load regulation and the starting and stopping of machines could be conveyed to the hydro operator when the telephone line was out of commission.

When it was desired to start up a new machine the substation operator closed the proper a.c. switch connecting the proper line to that machine and then advised the hydro operator who made similar connections at his end of the line. Then the wheel tender on the lower floor of the generating station received a clearance signal to operate



the gate to start the generator. As the generator came up to speed the rotary was supposed to start up and follow along. When the rotary failed to start, the substation operator would give the armature a boost, using a stick as the necessary lever. As soon as the generator and rotary came up to the proper speed the substation operator closed in his field circuit and noted the polarity on the d.c. end of the rotary. If this polarity happened to be wrong it was necessary to shut down both rotary and corresponding generator and start all over again. This process might happen two or three times in succession. After the machines were up to speed and the polarity correct at the substation, the substation operator so indicated to the hydro operator and proceeded to cut the rotary in on the d.c. system. As soon as the rotary

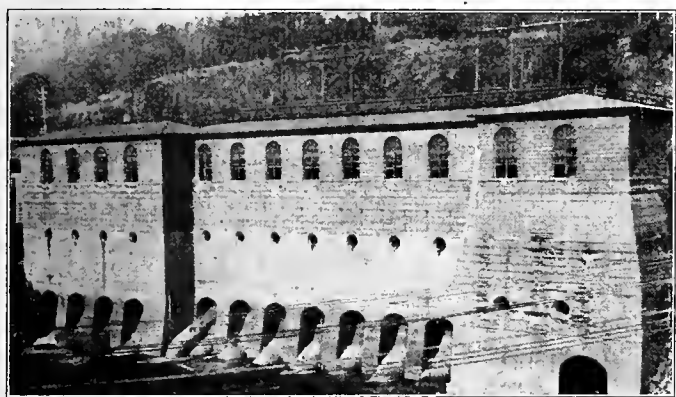


Fig. 2. Station B of the Portland Electric Power Company at Oregon City, Ore.

was connected to the d.c. system the generator operator built up the load according to instructions from the substation. Ammeters on the generator panels at the power house were used for load indication and operating voltages were maintained at such values as would give from 550 to 600 volts on the d.c. side of the rotaries. Power factor was not considered.

In addition to the transmission lines to the Portland substation there was a line serving a comparatively large load at the Portland Flouring Mills and a small motor load at the Southern Pacific shops. This load originally was handled on one generator but subsequently grew to proportions demanding two generators on the line. Synchronizing then was done with lamps and the 3-pole open knife switches on the generator panels. The operation sounds simple but old-time operators will know that it was no easy job. The system of operation between the power house and the flour mill was similar to that between the power house and the substation.

It was necessary to make all of the electrical connections and then start the generator, bringing up with it the motor at the flour mill. During this starting period the flour mill load was removed from its motor by means of a mechanical clutch arrangement. This of course meant that the entire load was thrown on to the generator at once,

imposing severe operating conditions. It was necessary for wheel tenders to be waiting at the gate wheel of the 60-in. runner in order to throw into service the 60-in. wheel for the initial starting period when the flour mill load was dropped on. The 42-in. wheels were governor controlled but the operating characteristics of the governors were such that as the generator slowed down the governor action also slowed down. To offset the initial load condition just mentioned it was necessary for the operator to throw water into the 60-in. wheel to provide additional starting torque. Due to the incident surge it was necessary often to repeat this starting operation two or three times before the motor and generator would remain in step and pick up the load properly. Later on as additional load was added at the mill it became necessary to operate the 60-in. wheel regularly during the load period in order to provide a suitable governing range on the 42-in. wheel.

The failure of a trolley wire adjacent to the substation frequently caused the rotary converters to kick off, resulting in overspeed and common flash overs on the machines at the generating plant. This difficulty was particularly acute during the period when the 600-volt d.c. generators originally used for exciter service were cut over for railway service, serving interurban trains between Portland and Oregon City. It was a frequent occurrence for a heavy freight starting on a grade or under other heavy load conditions to pull down the speed, causing the slow-acting governors to open the gates wide in order to bring the generator back up to speed. Then upon sudden reduction of power demand the slow-acting governors could not slow down the generator in time to prevent



Fig. 3. Old transmission line from Station B to Portland, carrying one circuit for each of the nine generators.

flash over and consequent service interruption. This particular condition, however, was overcome when the railway generators were mechanically tied to the a.c. generators as already mentioned.

During its long life Station B has been the scene of many interesting occurrences. It still is turning out kilowatt-hours and thus retaining its title of one of the oldest operating hydroelectric plants.

# Safety on Construction Jobs

## Educational Efforts Fully Justified

By D. H. Redinger\*

Resident Engineer, Southern California Edison Company, Big Creek Project

**S**AFETY in industry and safety on construction work have the same relationship as the father to the son. Experience has taught established industry the great economic and humanitarian value of safety as well as the increase in efficiency derived therefrom. By comparing the father with established industry which has learned by experience this great value, we shall compare the son to construction work in which so many excuses are made relative to the success of safety in the field.

It is true that we find a large percentage of men in the construction field who shift from job to job and feel satisfied to exist from day to day. This is the type of man who takes little interest in safety and does not want to be bothered with it until he sustains an injury. At such a time, if he can find where the company for which he is working overlooked some safety detail, he will see to it that the whole world knows about it and will leave nothing undone in the way of placing responsibility upon someone other than himself.

For these reasons alone safety methods on construction work are more important than in the established industry where men have more time to absorb their benefits and, if not prone to accept safety, it naturally grows on them. Again we find the type of men who have families and where, should an accident occur either fatal or resulting in permanent disability, their families become public charges. Another important factor in safety on construction work is the elimination of the improper publicity gained through construction accidents. The outside world gathers the impression that the lives of the men mean nothing, that protection is not provided, that construction projects are built on human lives and ruled by iron men; all of which is not true. Also, we find ourselves confronted with the financial loss to the employee and employer as well as the public. This, coupled with the humanitarian spirit, that just as many hearts are turned sad by the loss of this type of man as any other type, makes it worth while to make safety as distinct a job as any other in the construction field.

In this country safety work still is in its infancy.

***"It can't be done" is the usual answer to a suggestion of safety education on construction jobs. However, Mr. Redinger has proved the fallacy of this belief by the results that he has obtained with his Big Creek construction organization. Mr. Redinger has made safety education pay dividends to all concerned and is qualified to speak authoritatively.***

It was inaugurated a few years ago by the National Safety Council, a volunteer organization whose work in the beginning consisted of the installation of every known device for preventing accidents. At that time a few established industries began to safeguard machinery by safety appliances with the result that almost every established industry today recognizes safety as one of the greatest assets to its success.

However, the above-mentioned safety movement which started with the mechanical safeguards has developed a great reduction in accident frequency. Yet the desired results were not accomplished and all safety movements have resulted in the same conclusion, namely, that while mechanical safeguards are essential the majority of accidents are due to the ignorance and carelessness of individuals. Therefore, to secure the greatest results, safety educational campaigns are being started, maintained and made universal.

The educational propaganda for safety on a universal scale was started by the railroads throughout the country with their "Stop, Look and Listen" signs at railroad crossings. This was followed by safety posters or bulletins which have become a great help and very popular. The use of posters to point out means to avoid accidents or injuries is the first step of a safety education.

The Southern California Edison Company has established and maintains at Big Creek a safety department with a full-time safety engineer who makes continual inspections, recommendations and reports to the resident engineer. This department functions through the Big Creek accident prevention committee which is composed of the resident engineer as chairman, the safety engineer as secretary and the department heads as the other members. This committee meets once each month and discusses all items of safety which arise or are referred to it from the local camp accident prevention committee. Each camp has such a committee with the respective camp foreman as chairman and a secretary, both of whom are permanent members. Four additional members are selected and rotate so a new member is appointed and serves at each meeting. This rotation enables a greater number of employees to serve on the committees. Hence the distribution of

\* From paper prepared for the Engineering Section, Pacific Coast Electrical Association.

safety education covers a larger number of men than otherwise could be reached. They, too, meet once each month and make recommendations for safety in the camps. Minutes are made of the meetings of all committees for the information of members as well as for that of the management of the company showing the attitude and final disposition of all safety matters on the construction job. To further the educational program motion picture shows, bulletins, safety lectures and first-aid instructions are given from time to time.

Now that organized industry is teaching as a father, so must construction work learn as a son. Entire volumes have been written in recent years on safety and safety methods, and few topics connected with the industry have received more attention or made more rapid progress. The prevention of accidents to our construction workmen has not reached as high a plane of efficiency as we desire.

On many construction projects safety work still is more or less neglected, but its importance cannot be over-estimated, and it is needless to say we are forced to believe that safety must be observed. We are familiar with the laws regulating safety methods as well as regulating compensation to be paid to the injured and are happy to say the conditions of safety on construction have demonstrated their true value. The application of safety is the one great connecting link which protects the type of men who otherwise would not have the opportunity to gain this benefit.

Due to the shiftless nature of this type of men, great care must be made in the selection of foremen and sub-foremen who have the positive contact with the men. A great many papers have been prepared, read and discussed on the responsibilities of the foreman. True, on all work progress is wanted and must be made, yet safety must be maintained at any cost. So in the past reference comparing the son to the construction work we find it is a constant job to educate as well as to keep step with all the safeguards needed. Therefore, the selection of a foreman who is able to lead, teach and hold the respect of his men for their safety is essential. Often a foreman working with men of the type described, when advising safe working methods, is met with a retort of this kind: "Oh, it won't make any difference if I do get killed. There won't be anything lost." When a man makes this assertion all the reserve safety educational ability of the foreman is needed to show him that more than his life is at stake, that the lives of others and the humanitarian interest of the company are involved as well as the financial loss to both the employee and employer. Again, familiarity often breeds carelessness, hence continual effort on the part of the foreman must be exercised.

You readily may see that it is much easier to establish safety in an industry that is more or less permanent and where men spend years in the same plant than it is in construction, where the latter covers rough work and temporary jobs coupled with the short periods of time necessary to complete, but it can be done if proper attention is given to it. With the more permanent nucleus of a construction

organization rests the responsibility of safety, and each department head, foreman and sub-foreman must exercise every effort to instill this important subject in the workman. All this, with the co-operative and safety spirit of the safety engineer backed by his superiors, means the success of safety methods on construction work.

"Every construction job's safety welfare neglected is a continual drag on the forward march of civilization in the world today."

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## Progress in Apartment Electrification Made by Portland Utilities

INTERESTING because they indicate the trend in domestic electrification in Portland are the figures, compiled by one of the utility companies of that city, on cooking and refrigeration installed in the sixty-six new apartment houses built in Portland during the first nine months of this year. These sixty-six buildings contain 1,362 apartments, and among these, fifty-eight buildings containing 1,210 apartments have installed electric ranges as against eight buildings with 152 apartments that installed gas ranges. Computed on the number of apartments this figures 89 per cent using electric cooking against 11 per cent using gas.

Considering that the Portland Gas & Coke Company, with comparatively low rates on gas, is always an active competitor, this high percentage of electric cooking saturation in new apartments speaks exceedingly well for the sales work, past and present, of the Portland Electric Power Company and the Northwestern Electric Company, both of which shared in the sale of by far the greater bulk of this electric range business.

Slightly less striking though in many respects more notable, is the fact that in thirty-nine of the buildings electric refrigeration was installed. This resulted in equipping 856 apartments, or 63 per cent, with this more recent and less well-known development in electrical aid to domestic science. Of this business over two-thirds was divided between the power companies, refrigeration dealers securing the balance.

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### Statistics Compiled on Number of Wired Homes in Foreign Countries.

Switzerland has the highest percentage of wired homes of any country in the world according to figures compiled by the Electrical Equipment Division of the Department of Commerce. As against the 56 per cent of homes in the United States wired, Switzerland has 400,000 of its 415,000 homes wired or a percentage of 96.5. Four other countries exceed the percentage for this country. These are Japan with 73.4 per cent; Denmark, 72 per cent; Canada, 62.3 per cent and New Zealand, 59 per cent. The nearest to approach the total number of wired homes in this country is Japan which has 8,140,000 domestic consumers. The poorest showing among the European countries is made by Greece which has only 1 per cent of its homes wired. With the exception of Japan the showing in the Asiatic countries is poor.

# CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

## Long Span Construction Simplifies Distribution 330-ft. Secondary Spans Effect 67 Per Cent Pole Saving and Facilitate Stringing of Service Leads

By H. H. Kerr, Superintendent Electric Department, Public Service Company of Colorado.

Study of distribution economics in the city of Denver has brought about the design and adoption by the Public Service Company of Colorado of a one-pole-per-block scheme utilizing 330-ft. spans. This long-span distribution construction was worked out first for rural territory and subsequently adapted to city problems. While prac-

served. The secondary wires are supported at two points in the span by 2-spool racks attached to the messenger by means of a piece of strap bent into an inverted V and bolted to the messenger. To prevent the secondaries from being whipped over or around the messenger in cases of heavy winds they are carried on pins

of spool insulators and is tapped by means of a short jumper to either side of the 220-volt secondary as conditions dictate. The neutral or ground lead of the service is attached directly to the steel messenger by means of Crosby clamps. In making service-lead connections it is necessary only to stand a ladder up against the messenger. A ladder of sufficient length and fitted with hooks to prevent the messenger slipping from under the upper end of the ladder is used.

To compensate for the uneven strain that is common in adjacent spans the messenger is anchored to each pole. A suspension clamp and eye-bolt holds the messenger, prevents creeping and provides flexibility that should obviate crystallization.

### Advantages

Outlined briefly the advantages accruing from this type of construction are as follows:

1. Fewer poles required, reducing first cost, maintenance, and capital charges.
2. With 330-ft. spans in blocks of 600 ft. with 60-ft. streets there can be but one pole per block to interfere with garage entrances, etc.
3. In Denver the city requires a deposit of \$5 per pole for placing or moving in paved alleys and 50 cents in unpaved alleys. The saving in using only one instead of five intermediate poles per block is obvious.
4. Service loops may be taken off at any convenient point avoiding interference with trees, buildings, or other obstructions, and resulting in shorter leads with attendant saving in copper and line loss.
5. Property crossings of service leads and incident petty disagreements and differences are practically done away with.

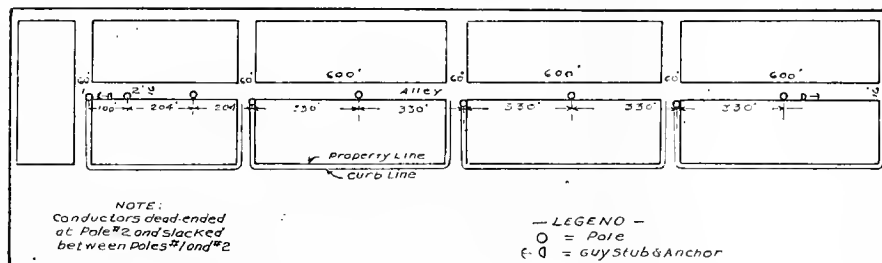


Fig. 1. Plan of 4-block section of long-span distribution system showing the uses of only one mid-block pole and the method of guying at T alley intersections.

tically all of Denver's distribution system is carried in alleys it is an item of vast saving in first cost and in maintenance costs to reduce the number of poles per 660-ft. block from six to two. This is accomplished by the new system, which also results in greatly improved neighborhood appearance. The only places where extra poles are necessary are at dead-ends and at alley intersections where the strain must be taken up before making a tie to the transverse pole line, sufficient side guying being impossible on the transverse line.

### Features

The features of this scheme are the use of No. 4 steel-reinforced aluminum cable for the primaries, the use of a 3/8-in. steel messenger cable to support the No. 4 weatherproof copper used for secondaries, and the support of the secondaries at 110-ft. intervals by brackets attached to the messenger. Secondary distribution is three-wire 110/220-volt, the steel messenger serving as neutral ground lead. Clearance distances and general construction details are shown clearly in the accompanying illustrations.

Service drops may be handled much more expeditiously from the messenger than from the usual intermediate poles. With poles there is but one point from which service leads may be taken off for any one group of dwellings regardless of what obstructions may intervene. With the messenger it is possible to drop service leads from any point convenient for a straight unobstructed run to the building to be

located in the outside positions of a 4-pin arm at each end of each span.

Service drops are carried in opposite directions from coincident points on the messenger wherever possible in order to equalize the side strain. The hot wire of the service lead is suspended from the messenger by means

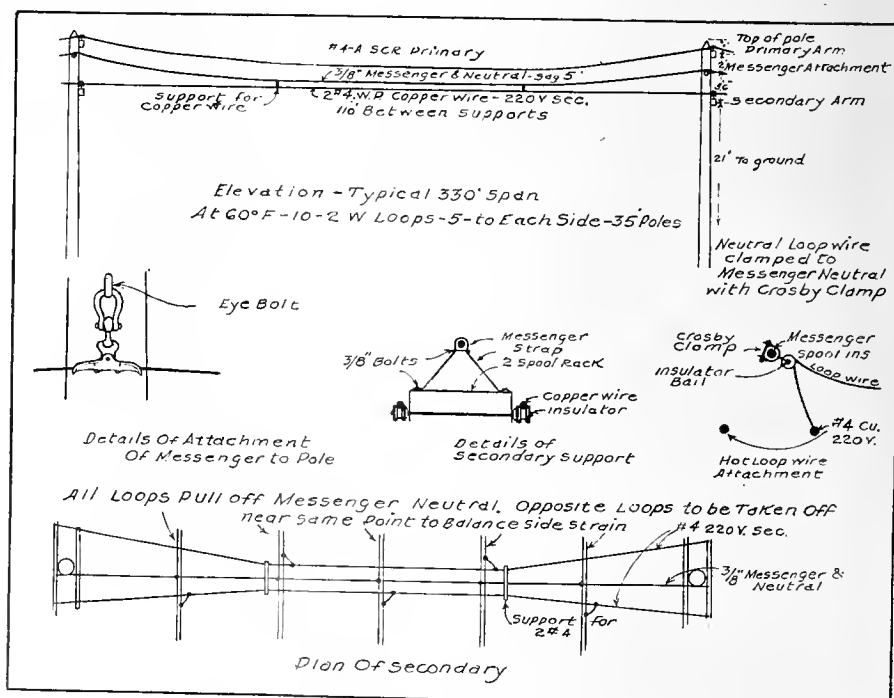


Fig. 2. Plan (below) and elevation (above) of a single 330-ft. secondary span showing scheme of construction and showing also (center) certain details.



6. Costs are nearly the same as realized through joint construction with communication companies.

7. All restrictions incident to joint construction are avoided.

8. Power company has complete ownership of all poles.

### Disadvantages

The outstanding disadvantages may be summarized as follows:

1. This type of construction can be applied only to pole lines carrying but few classes of service.

2. Use is restricted by local geography.

3. Particular care must be exercised in guying.

The strain of conductors not supported by messenger is such that crossarms to which they are attached must be guyed to suitable stubs and anchors at all dead ends. Since the strain in the secondary conductors is reduced by supports intermediate in the span crossarm guying is not necessary in this case. A suitable anchor capable of withstanding the maximum messenger strain is all that is necessary where there is secondary service only. Where alleys are so located, as at T intersections, that proper guying facilities are not obtainable it is necessary to install a short-slacked span, the alley lead being anchored within such span before attachment to the transverse line at a self-supporting corner pole.

### Saw Speed Readily Controlled by Simple Equipment

By H. H. LIGGETT, Electrical Superintendent, Hutchinson Lumber Company, Oroville, Calif.

Different classes of timber require the operation of head saws at different tooth speeds. Experience has proved that a tooth speed of about 9,500 ft. per minute is well suited to pine or other soft timber but is entirely too high for red fir or other harder woods.



Fig. 1. Showing method of attaching rotating speed-control relay to motor frame. Belt drive facilitates adjustment without shutting down band mill.

The latter material is best handled at a tooth speed of about 8,000 ft. per minute.

Both grades of lumber are handled, as they come in, at the Hutchinson Lumber Company plant at Oroville, Calif. Inasmuch as the major portion of the material handled is pine, all head-saw speeds originally were based upon values suitable for the soft wood. Experience showed that attempts to saw fir logs with the higher saw speed and with the same rate of saw-carriage movement resulted in "snaky lumber" as the result of sawdust packing in behind the teeth of the saw.

Speed control obviously being necessary in order to permit the sawyer to reduce his head-saw motor speed when cutting hardwood logs, a device was

rigged up that is giving excellent service. The first step made was the introduction of a block of resistance into the motor circuit, controlled by a contactor and push button.

This method was only partially successful due to the fact that the heavy flywheel effect of the band saw and pulleys rendered impossible the desired rapid changes in speed. Further than this experience proved that with the resistance in the circuit the speed curve of the motor and head saw would "break" frequently and badly on heavy cuts. Thus it became evident that some automatic means of maintaining definitely the desired slower speed would be necessary. Further, it was obvious that such equipment to be efficient under the circumstances must operate without attention when once set for a definite speed.

Several devices and combinations were tried out with varying degrees of success. A G.E. type TDSL-7 speed-control relay finally was decided upon and used in conjunction with an extra block of secondary resistance, a magnetic switch and operating relay. This equipment has given satisfactory operating results. The speed-control relay as it appears when mounted on the head-saw motor is shown in Fig. 1. A complete wiring diagram of the control device showing its method of application to the head-saw motor control is shown in Fig. 2.

In Fig. 1 it may be noted that the relay shaft is driven by means of a belt and pulley rather than by direct connection. This method of mounting was decided upon because it permits the relay to be removed from operation simply by slipping the belt over to the idler pulley appearing at the right. With the relay thus shut down it is possible to adjust its contacts to give any desired speed or to do any necessary maintenance work on it without shutting down the band mill.

### Cycle of Operation

As a further explanation of this equipment the cycle of operation may be of interest. Assume that the sawyer is cutting pine and thus the motor is operating at full speed with all secondary resistance cut out. Under these conditions the sawyer's speed-control switch is in the high-speed position and the drum controller is in the full running position. To switch this condition to permit the head saw to be used on fir logs the first operation is to move the drum-controller handle to

the required setting for the lower operating speed. The second operation is to throw the speed-control switch to the low-speed setting.

The results of these operations are as follows: Motor speed is reduced by the introduction of resistance incident to the lower position of the drum controller. Then, if the speed falls below the desired low value the contacts of the speed-control relay close, causing the operation of contactor A (Fig. 2) energizing the operating coil of the 300-amp. contactor B (Fig. 2). When contactor B operates closing its contacts it shunts out a block of regulating resistance thereby causing the motor speed to rise. Conversely if the motor speed goes too high the speed-control relay contacts open and the block of regulating resistance again is cut into the circuit and the motor speed dropped. This cycle of operation is repeated at a rate depending upon the rate of cutting speed and the size of the particular log being handled at the moment.

When the sawyer desires to increase the speed of the head saw to full value it is necessary only to reset the drum-controller handle to full position and to throw the speed-control switch to the high-speed setting.

It may be noted from the wiring diagram shown in Fig. 2 that all control-circuit power is taken from the motor terminals. Thus all control circuits are totally de-energized whenever the motor is cut out of service. Practically any speed within reasonable requirements may be obtained by simple adjustment of the speed-control relay and the controller handle.

Electric heating units used to preheat the air supply of an air-operated shovel on the Great Northern Railroad tunnel project have greatly increased the efficiency of the equipment. Prior to the installation of these electric heaters much trouble was experienced due to the freezing of the exhaust ports in the large power shovels as a result of the cooling effect of the expanding exhaust air. The introduction of a set of electric heaters in the air receiver tank on the shovel has entirely overcome this difficulty and increased the operating efficiency by this relief from freezing and also due to the increased air pressure incident to the higher temperature of the air-receiving tank. Operating records show that the net cost of the power consumed for this elastic heat is extremely low.

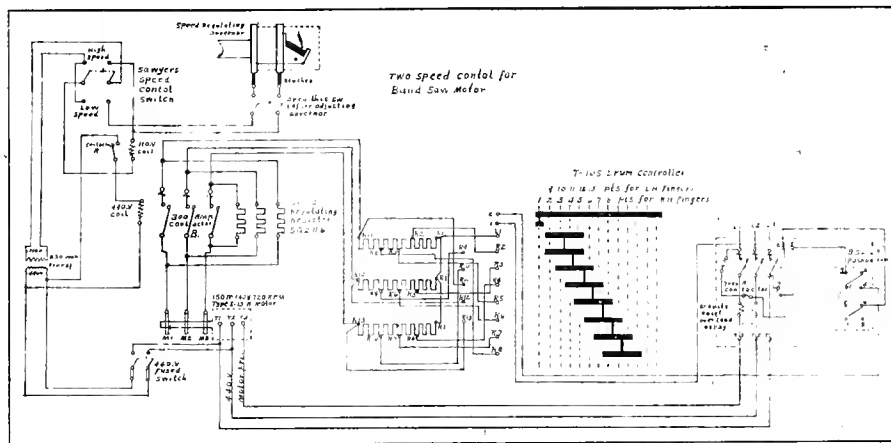


Fig. 2. Complete wiring diagram of band-mill electrical control showing method of inserting controlling relay, contactors and resistances.

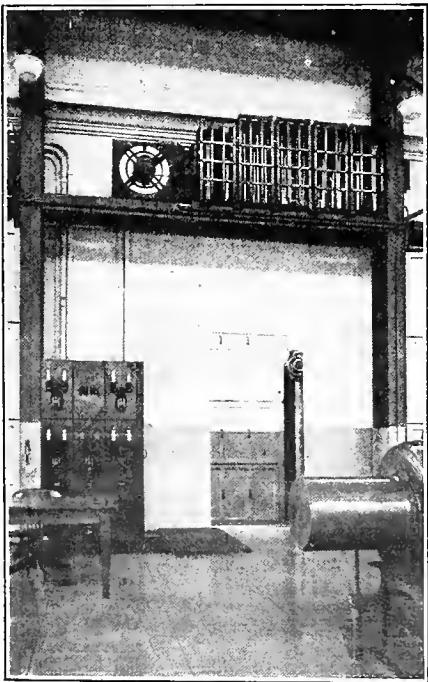
### Three-Phase Voltmeter to Check Potential Fuses

By L. F. HUNT, Development Engineer,  
Southern California Edison Company

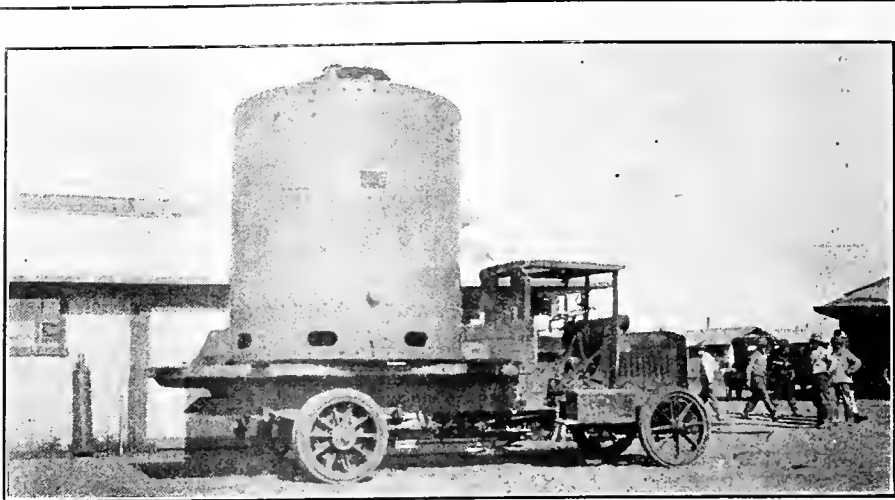
A blown fuse in a potential transformer circuit may cause improper synchroscope operation. Some time ago the Southern California Edison Company experienced some trouble with 60-kv. fuses in potential transformer circuits. These fuses in many cases failed without there being any apparent voltage drop as indicated by station instruments. In cases where two potential transformers are used and one used for synchronizing it is very likely that a fuse failure will cause a very erroneous indication of phase relations.

Some means of checking these possible conditions at the switchboard was desired. Accordingly a 3-phase voltmeter was devised. This voltmeter is so arranged that it gives a zero indication when the three phases are equal and 120 deg. apart. However, when a phase shifts or a phase voltage changes the meter indicates such changes.

When this special instrument is energized from one single-phase source accurate readings can be obtained. Therefore, if the ordinary single-throw synchronizing switches on the switchboard are arranged to be double-throw, the condition of 3-phase voltage can be checked by throwing the switch in one direction. By throwing the switch in the other direction single-phase voltage may be impressed upon the synchroscope for synchronizing purposes. This scheme permits a ready and rapid voltage (fuse) test practically at the



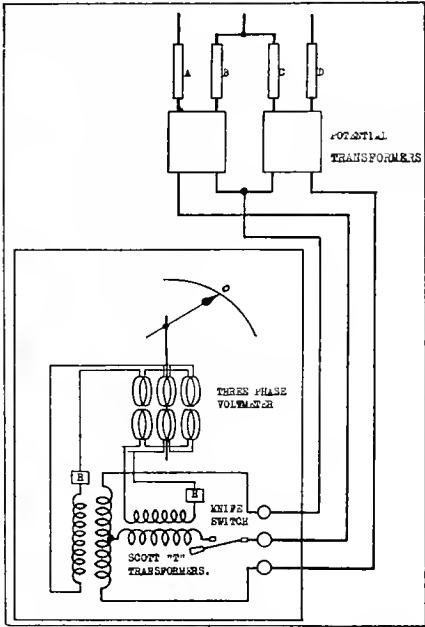
It is desirable to mount field resistors where they are accessible and where the face-plate at all times is visible to the machine operator according to present-day standards. This is accomplished with an economical use of space as shown above, where they are mounted upon one of the members of the steel frame of the building. The crane girder and a projection from the wall serve as partial protection from dust. The installation shown is at the Newark substation of the Pacific Gas and Electric Company.



Oil circuit breakers are not what they used to be, as is evidenced by the view above which shows one of three tanks of a new Westinghouse, 220-kv., type G-2 switch being moved into Vaca-Dixon substation of the Pacific Gas and Electric Company. This switch is rated at 20,000 amp. for 5 min. and has an interrupting capacity of 3,100 amp., both at 220 kv.

moment the synchronizing is to be done, insuring correct indication.

A test check of the 3-phase voltmeter as described above was made on the Bandini 60-kv. line out of the La-



Wiring diagram and schematic arrangement of 3-phase voltmeter

guna Bell substation. With fuses open as indicated in the table below, 3-phase and single-phase voltages were as shown in the table: (Refer also to accompanying illustration.)

Fuses Opened	3-Phase Volts	1-Phase Volts
None	0	103
A	43	103
B	65	103
C	50	98
D	70	98
A & B	92	103
B & C	20	98
C & D	90	0
A & C	50	98
A & D	76	98
B & D	50	98

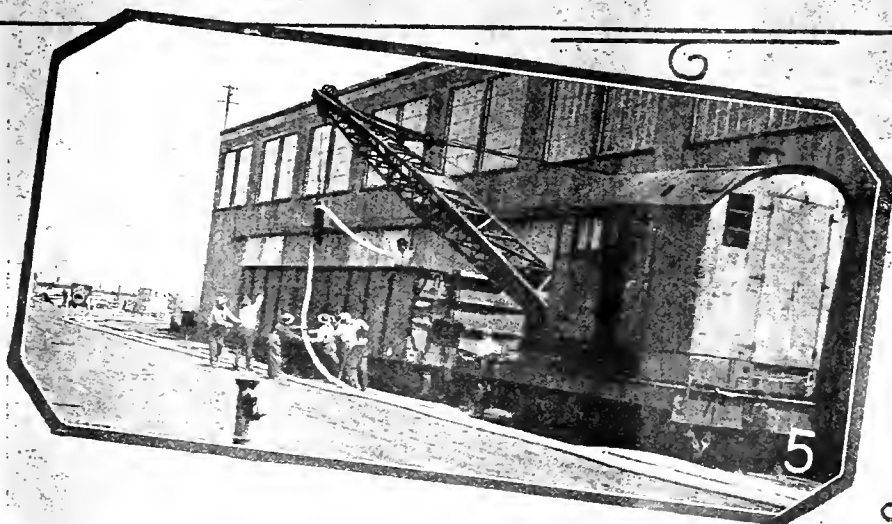
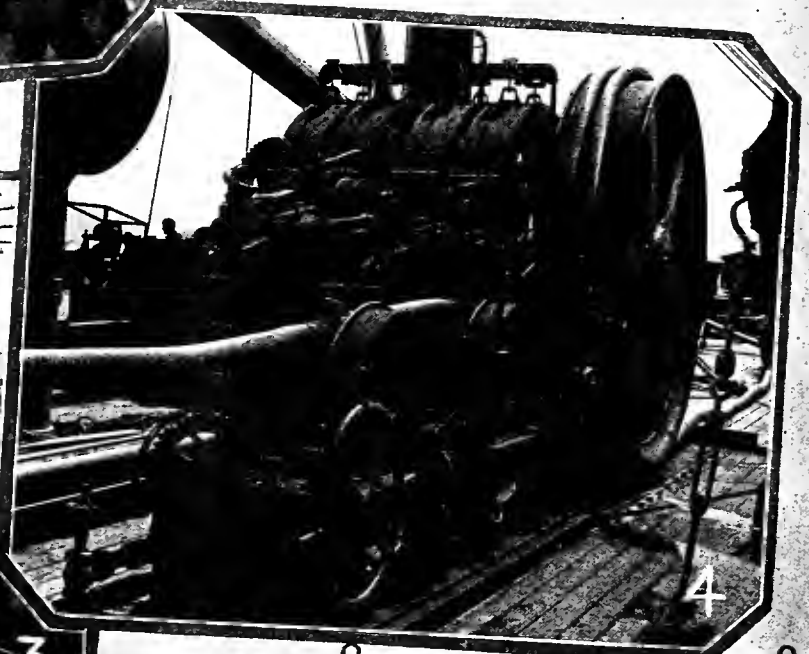
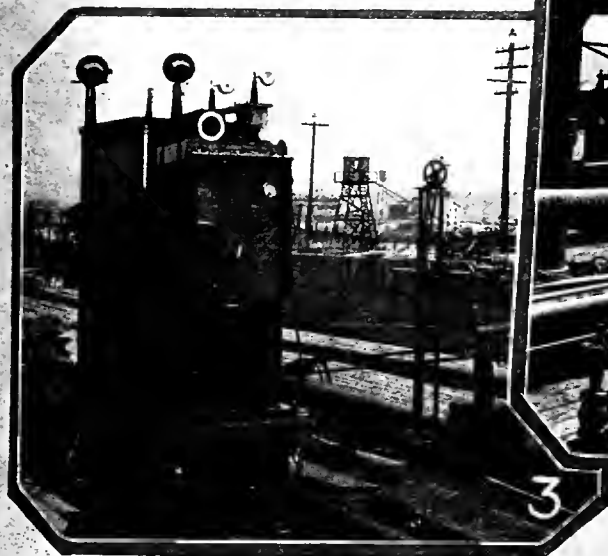
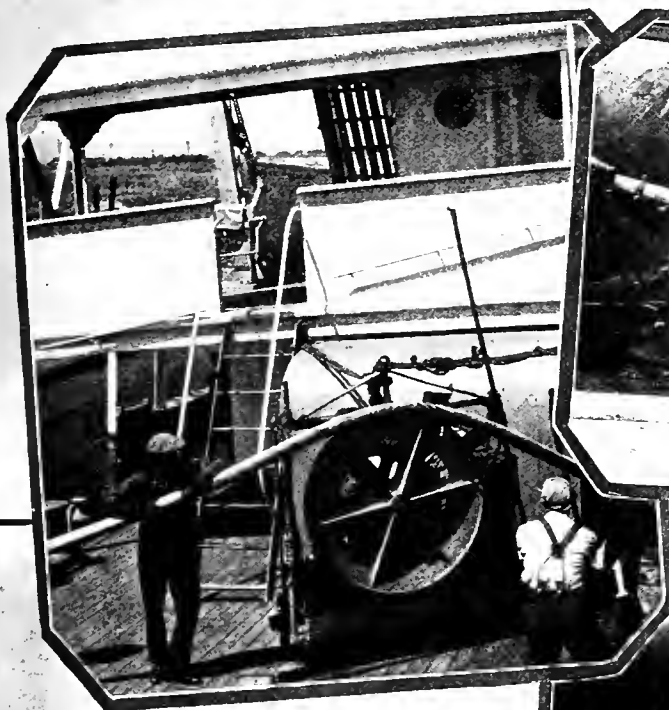
Construction of the 3-phase voltmeter is indicated in the schematic

diagram shown in the accompanying illustration; wiring diagram also is shown. The instrument itself is a 3-phase, zero-center indicating wattmeter, the elements of which are rewound for voltage, instead of current, and connected as shown. The 3-phase 110-volt source energizes the 3-phase end of the Scott or T-connected bell-ringing transformers. These bell transformers are rewound so as to give equal voltages on the 2-phase side. One of the phases of this 2-phase source energizes one set of coils in the voltmeter and the second of the two phases energizes the second set of voltmeter coils. Thus when the two voltages are equal the opposing torques of the two coils of the moving element of the 3-phase voltmeter cause a zero indication. It is obvious that any unbalance in voltage will cause a tell-tale rotation of the instrument pointer.

The instrument serves in many applications where it is desired to know if the three phases of a 3-phase system are equal and 120 deg. apart. Standard equipment may be used and the changes necessary are simple.

**Increased Use of Creosoted Pine Poles.**—The use of pressure-creosoted pine poles in 1924 showed an increase of nearly 100 per cent over the 1923 figures, according to the Service Bureau of the American Wood-Preservers' Association. The following statistics, covering pressure-creosoted pine poles for each of the last eight years, have been compiled by R. K. Helphenstine, Jr., of the U. S. Forest Service in co-operation with the above association. Figures on creosoted pine poles as a separate class never before have been given out.

Year	No. Treated
1917	103,804
1918	67,541
1919	156,846
1920	167,289
1921	224,777
1922	291,991
1923	451,852
1924	899,201



**METHODS** used by the Puget Sound Power & Light Company in installing two 3-conductor, 250,000-circ.-mil, rubber-insulated, steel-armored, 15-kv. cables across Puget Sound from Seattle to the Olympic Peninsula. 1. Paying the cable into the hold of the U.S.S. Dellwood. 2. Portable vulcanizing equipment. Each 4½-mile cable was made up of 2,700-ft. lengths, the latter being a full carload. 3. X-Ray equipment used to obtain photographs of cable joints to ascertain their quality. 4. Paying-out machine on deck of ship. Note quadruple break arrangement for close control of cable. 5. Unloading 2,700-ft. length of cable from one of 18 gondola cars in which cable was shipped from Passaic, New Jersey.

# IDEAS FOR THE CONTRACTOR

## Electric Steam Generator in Pressing Shop

Many Advantages to Steam from Sterilizer Unit for Pressing Clothes and Costs are Nominal

Among the possibilities for the use of the electric steam generator aside from the most general use in connection with dairy sterilizers, is the possibility for using such apparatus to supply steam for clothes-pressing machines. Considerable experimentation along this line has been done in the Northwest and a number of successful installations have been made.

An opportunity to get complete data as to operating costs of such an installation has been presented, however, in Paso Robles. The Paso Robles

Commission since the patentee of the equipment assumes this responsibility.

The equipment is wired on single-phase 220 volts, and so far the electric bills have been in the neighborhood of \$30 a month. The electric steam generator eliminates the great danger from smoke and ashes formerly necessary with other types of steam generators. A much cleaner shop is possible and a great deal of time is saved, no fueling being necessary. Formerly a wood boiler was used in this plant and required considerable attention. With the electric steam generator it is not necessary to clean it out. The steam boiler is blown out about once a week and that is all the attention necessary.

Steam pressure is kept to 100 lb. at all times. The boiler is lagged with 3-in. lagging, keeping the shop cool for the men working near it. An individual meter was installed on the generator in order to obtain the 1.3 kw-hr. rate of the Midland Counties Public Service Corporation, serving that territory.

The steam generator is of the solid tube type with brazed joints, so that there is no chance of rivets giving away or of corrosion. Steam pressure is kept uniform at all times very easily and the boiler is very economical on the use of water. The installation

was made by B. P. Bretherton, Electricist, of Paso Robles. An accompanying table shows the meter ratings over a period of three or four months operating costs and the kw-hr. consumed and gives a good indication of the sumption.

The use of the electric steam boiler in connection with pressing machines would indicate that a much more extensive field for such installations is open. There are a large number of steam pressing plants in use in practically all parts of the West. Considering that the steam boiler at the Paso Robles plant operates two pressing machines and a drying room and that the installation provides great saving of time and makes for a much cleaner pressing plant, the cost of operation compares very favorably with any other fuel.

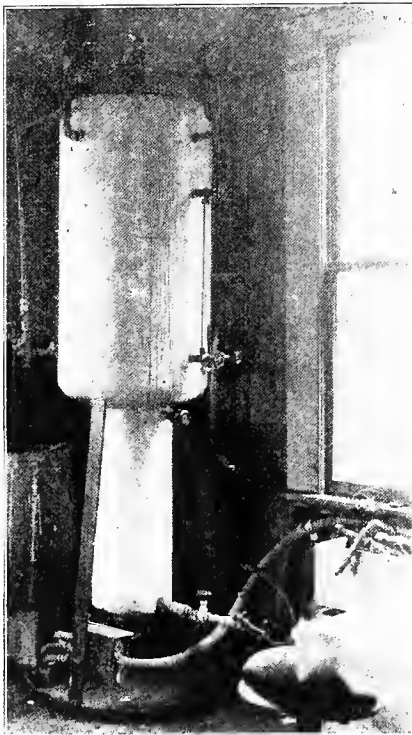
### Operating Costs on Electric Steam Generator for Clothes Pressing

Installation, 1 15-kw. boiler. Serves 2 pressing machines and drying room.

Date	Readings	K	Consumption	Amount
1-20-26	3220	20	1660	\$26.45
2-19-26	3328	20	2160	31.38
3-20-26	3477	20	2980	42.04
4-20-26	3610	20	2660	37.88

### Electric Dairy Uses Motors and Steam Generator

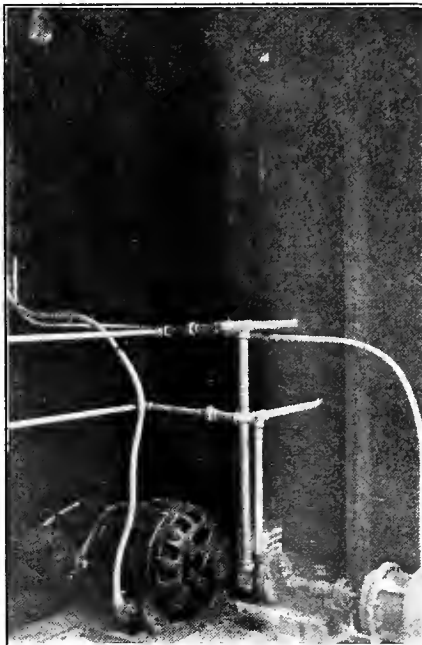
As an example of complete electrification of the small dairy, the Holstein Dairy Company of Santa Maria, Calif., demonstrates to what extent electricity may be used about the premises of a modern dairy. Not only is the equip-



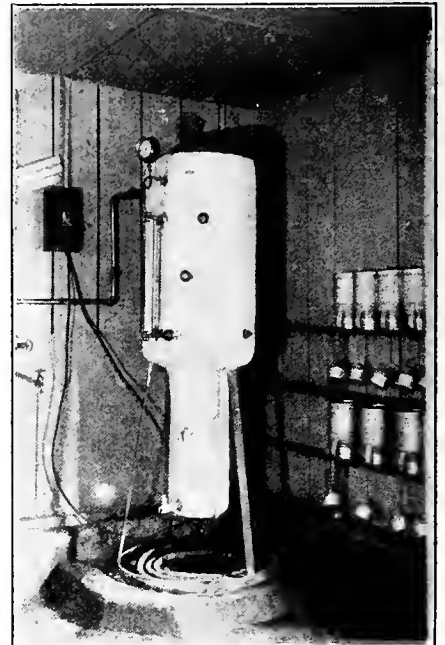
Steam generator such as used for dairy sterilizers in use in clothes pressing shop.

Vapor Cleaner Company, a dry cleaning shop, uses a San Joaquin sterilizer steam generator for supplying steam to its pressing machines. Although the installation was somewhat in the nature of an experiment, it has proved very successful.

The steam generator provides steam for two pressing machines and for a drying house. A 15-kw. generator is used, automatically controlled. Automatic control is provided by General Electric C.R.-7007-83 magnetic switches. Its capacity is equivalent to 2½ or 3 hp. No license is required of the owners from the Industrial Accident



Motor applications in domestic and dairy water supply at Holstein Dairy.



Steam generator used for sterilizing dairy equipment.



ment of the dairy itself electric but the home of the owner is electrical throughout.

The dairy is equipped with a milking machine, refrigerating plant, electric steam boiler and a number of pumps.

The milking machine is electrically driven, using a  $\frac{3}{4}$ -hp. motor. The refrigerating equipment consists of an ammonia plant and utilizes a 5-hp. motor for the compressor. A 1-hp. motor is used for circulating the water for cooling purposes and a 1-hp. motor for circulating the bran mixer.

For water supply a 3-hp. motor on the tank house pump is used.

For irrigation uses about the farm a 50-hp. pump is utilized. The sterilization equipment is fed with live steam from an electric steam boiler of 15-kw. capacity. A San Joaquin steam boiler is used. Electric bottle washer and electric milk separator are also employed.

The electrical installation at this dairy was made by the Electric Shop of Santa Maria.

**Electricity in Spray Plants.**—A progress report written by B. C. Moses and W. P. Duruz in co-operation with T. A. Wood of the California Committee on the Relation of Electricity to Agriculture, entitled "Stationary Spray Plants in California," has recently been issued by the University of California College of Agriculture as its Bulletin No. 406. The use of electric motors in connection with such spray plants is illustrated in a number of ways and recommended in this pamphlet where electricity is available. The

results of a number of field tests to determine the mechanical features and characteristics of the systems in use are given. Among the points investigated were voltage of the motor and line drop, power required, power factor, speed of motor and pump, etc.; operating costs and costs of installations are also analyzed.

## Direct Connection Applications in Woodworking Plant

A novel application of double shaft drive on a motor was installed recently by the California Electric Works of San Diego, Calif., in the woodworking shop of the Dixie Lumber Company, San Diego.

The motor is a Howell and is used to drive both a table saw and a boring machine. The table saw is in use practically all of the time whereas the vertical boring machine is seldom used. The double shaft eliminates the necessity of shifting the belt constantly. After taking the pictures shown the belts were enclosed for safety.

Another interesting application of a similar motor in the same plant is of the boring machine converted from belt driven to direct connection. The boring machine spindle was permanently attached to the shaft of the motor and set in position for horizontal boring.

Similarly a belt-driven joiner was converted to direct connected by means of a coupling. Increased safety and more facile operation results from these chanveovers to direct-connected drive.



Direct-connected motor applications: at left on horizontal boring machine; center, double shaft drive of table saw and vertical boring machine, and at right, direct-connected joiner.

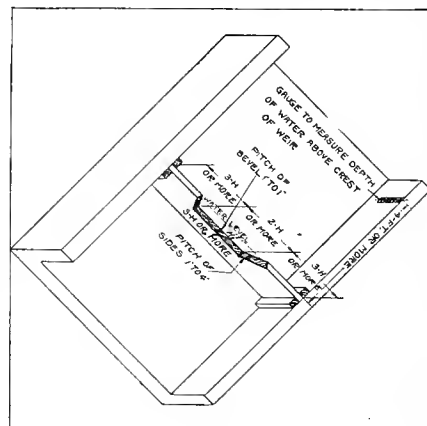


Fig. 2

Obstruct the water until its rises precisely to the bottom of the notch. Then drive a stake in the pond about 8 ft. above the notched board, or dam, with its top precisely level with the bottom of the notch and the depth of water can be measured with a rule after water is flowing free. The distance measured on the rule is the theoretical depth of flow corresponding with the quantities given in the weir table.

The miner's inch is a method of measurement frequently practiced by the various hydraulic companies in California and throughout the mountainous and mining sections of the country, in disposing of water to their customers. The term is more or less indefinite for the reason that the water companies do not all use the same head above the center of the aperture and the inch varies from 1.20 to 1.73 cuft. per min. each, and by common practice it has come to be understood generally that a gal. per min. is a basis for figuring a miner's inch.

The duty of water is usually defined as being the amount of water necessary to produce a crop and varies according to the kind of crop and the soil as well as climatic conditions. The unit of measurement for reservoirs is the cubic foot, but this is too small

## Electrical Estimating for the Contractor – XVIII

## Installation Examples Illustrating Methods of Pump Estimating to Provide Adequate Power

By J. R. WILSON\*, Quality Electric Company, Los Angeles

There are five methods generally used for computing the quantity of water pumped from a well.

1. Weirs.
2. Venturi water meters.
3. Calibrated nozzles.
4. Pitot tubes.
5. Delivery to a vessel of known capacity.

The most common of these methods is the weir, and there is a variety of ways of making a weir. One of the most widely used in Western irrigation districts is the "Cippoletti Trapezoidal type." Fig. 2 shows the general construction of a weir of this type and while construction with concrete is

recommended, the weir can be built of heavy planks made perfectly smooth on the inner side. The water should flow through the weir slowly and without turns for at least 50 ft. Table IX has been computed for a 1-ft. "Cippolletti" weir but may be used for any length of weir by multiplying by the weir length in feet. A 1-ft. weir should not be used for more than 300 gal.

Where it is not desired to build a weir for permanent or periodical measurement of the water a temporary weir may be constructed and installed as follows: Place a board or plank in the stream at some point where a

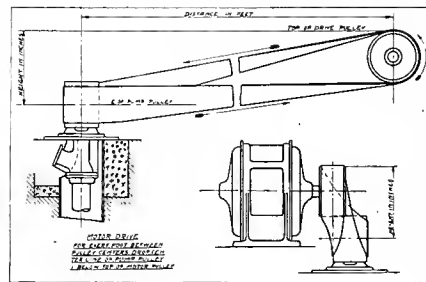


Fig. 3

for convenient use and the acre-ft. (or quantity which will cover an acre 1 ft. deep) is used more generally for large bodies of water. The term acre-ft. is to be preferred as it bears a direct relation to areas to be covered with water. The time-unit is usually one second, and flowing water is measured

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1. Capacity of pump desired.
2. Total suction lift.
3. Total discharge lift.
4. Length of suction and discharge pipes, together with number of elbows in line.
5. If it is desired to use any particular diameter of suction or discharge pipe, these should be specified.
6. Liquid to be pumped—whether it contains grit or sediment; acids, hot or cold liquids, if hot, state temperature.
7. Kind of power to be used—state voltage, phase and cycles.
8. If price is to include motor, this should be stated.
9. If motor is on hand, state horsepower, pulley diameter, and revolutions per minute.
10. State source of water supply, and if from bored well, give diameter.

Fig. 1 shows a typical installation of a single-suction direct-connected pump. This type of unit can be installed in a pit of 4x7 ft. for the small sizes, and 4x9 ft. for the larger sizes, but more room should be allowed



At the Salinas Dressed Beef Company a 15-hp., 220-volt Century motor is installed as shown. No compensator is needed on this motor due to its construction. It is used in connection with the compressor used to chill the refrigeration room, 40x20 ft. A temperature of 36 deg. F. is maintained by automatic control. In this room there are fifteen 200-watt lamps. In addition to the cooling capacity the refrigerating equipment is capable of making 15 tons of ice daily.

if possible to provide working space around the pump. The suction pipes should be as short as possible and if elbows are necessary they should be of as large a radius as possible. The suction pipe should be only large enough to allow a velocity of not more than 8 ft. per sec.

On small plants this result will be obtained if the suction pipe is at least 2 in. larger than the pump intake, a 5-in. pipe for a 3-in. pump, a 6-in. pipe for a 4-in. pump, etc. The lower end of the suction pipe should be submerged when pumping from 3 to 7 ft. in order to prevent air from being drawn into the pipe, thereby causing the pump to lose its priming.

The writer is indebted to the following firms for the use of much of the data contained in this article:

Layne and Bowler, Pacific Pump Company.  
Byron-Jackson, Link-Belt Company, Allis-Chalmers Company and Kimball Pump Company.

### Is it Just a Matter of Taking Bids?

There has never been built a house into which "Old Joe Gloom" has not stepped across the threshold. He is the lad who says it with a smile and you've got to take it or hand him his hat.

He'll find a crack in the plaster, a door that turns back the wrong way or electrical inconvenience that tickles his sense of humor.

A great many of the electrical conveniences can be turned easily into a running fire of praise by the new home owner if the electrical contractor is a little more interested than in merely getting the wiring bid. It is a simple matter to find out what the home builder wants. Sometimes an introduction to the owner from the architect is possible. Then follows a talk with the plans in hand to find out what furnishings are going into each room and to settle on the best location for the wall and floor outlets, the wall lighting brackets and the switches.

When it is time for fixtures the wise contractor will show all of the newest of designs even though he may have only samples in his shop. For instance, a shaving light for the bathroom with a convenience outlet in the base in which the lady of the house may plug in an electric curling iron, will become a feature of inspection visits by friends and neighbors of the proud new home owner. An electric light attached to the side of the under shelf of the electric range, a bullseye switchplate for the basement light switch will also be pointed to later with pride.

That could be one way to stop the Joe Glooms and make people ask, "WHO WAS YOUR ELECTRICAL CONTRACTOR?"

## Question Box

Arrangements have been made to answer through the columns of the Journal of Electricity such questions on electrical construction and other subjects as are of general interest. Inquiries should be sent to the Editor, Journal of Electricity, 883 Mission Street, San Francisco.

Q. 15. What should be the relative cost between a guaranteed rebuilt motor and a new motor of the same size and specifications?—G.L.P.

A. Most reputable dealers sell guaranteed rebuilt motors at 65 to 70 per cent of the price of new motors.

Q. 17. What is a good average value for carrying capacity of magnet wire for armature and field windings?—A.M.S.

A. A fair average in practice is 500 circ.mil per amp. for armature windings, and about 800 to 900 circ-mil per amp. for field windings.

Q. 19. Can you give a table of costs of excavation and back filling per cubic yard—L.J.R.

A. Cost of excavating and back filling per cubic yard:

Labor per Day	Yards per Day			2 1/4	3
	2	2 1/4	2 1/2		
\$1.50	\$.75	\$.666	\$.60	\$.545	\$.50
1.60	.80	.711	.64	.581	.533
1.70	.85	.755	.68	.618	.566
1.75	.875	.777	.70	.636	.583
1.80	.90	.80	.72	.654	.600
1.85	.925	.822	.74	.672	.616
1.90	.95	.844	.76	.69	.633
2.00	1.00	.888	.80	.727	.666
2.25	1.125	1.00	.90	.818	.75
2.50	1.25	1.11	1.00	.909	.833

If higher labor rate is paid, multiply cost according to rate paid. The above data was compiled by The Fiber Conduit Company.

Q. 20. Why is a shunt strip used on the series winding of a dynamo?—M.S.A.

A. To adjust the degree of compounding, by lengthening the shunt strip the series winding is strengthened, and the machine thus can be made to increase its voltage as the load increases.

Q. 21. What size of trolley wire is used on street railways?—C.D.L.

A. No. 0 hard drawn copper for short lines where speeds are not high, and No. 00 or No. 000 for long lines and high speeds.

TABLE XII

Dimensions and Weights						Overload Capacity Factors					
Max. Shaft Diam., Inches	H. P. Per 100 R. P. M.	Max. Rev. Per Min.	Will Transmit Power of Shaft Inches	DIMENSIONS, INCHES			Weight Complete	DESCRIPTION OF DRIVEN UNIT	Gasoline or Oil Engines	Reciprocating Steam Engines and 4-Cylinder Gas Engines	Motors or Steam Turbines
				F	G	H					
1	3/4	4000	1 1/2	4	1 1/2	1 1/2	8	Centrifugal Pumps, Blowers, Uniformly Loaded	1.5	1.2	1.0
1 1/8	6	3500	1 3/4	5	1 5/8	1 3/4	11	Generators of even torque	2.0	1.7	1.5
1 1/4	1.5	3100	1 7/8	6	1 3/4	1 3/4	16	Line Shaft, Med. Shock, heavy torque	2.0	1.7	1.5
1 1/2	2	2700	2	7	2	1 3/4	19	Pulp Grinders, Beaters, Fans and Compressors	2.0	2.0	2.0
2	3	2300	2 1/8	8	2 1/4	2	30	Triplex Single Acting Pumps	1.5	1.5	1.5
2 1/2	3.7	2000	2 3/8	9	2 1/2	2 1/4	39	Jaw Crushers, Tube and Ball Mills	2.0	2.0	2.0
3	7	1800	2 7/8	10	3	2 1/2	66	Hoists of all descriptions, Deep Well Pumps	2.0	2.0	2.0
3 1/2	9	1400	3	12	3 1/2	2 1/2	101	Generators not uniformly loaded	2.0	2.0	2.0
4	19	1100	3 1/2	15	4 1/4	2 1/2	171	Band Saws, Resaws, Strickers and Gang Edgers	2.0	2.0	2.0
5	30	900	4	18	5	2 1/2	294				
5 1/2	40	900	4 1/2	18	5	2 1/2	296				
6	60	820	4 3/4	21	5 1/2	2 1/2	481				
7	100	700	5	24	6	2 1/2	572				
7 1/2	155	550	5 1/2	30	8	2 1/2	1204				
8	230	550	6	30	8	3 1/2	1220				

The horsepower ratings in table are for smooth and steady service. For unusual conditions the table of overload capacity factors must be used in selecting proper size couplings. For example: A deep well pump is to be connected to a 20 HP. motor running at 900 RPM. Reference to the table below gives for deep well pumps with motors a factor of 2.0; that is, a coupling should be selected having a capacity of 40 HP. at 900 RPM., which would be equivalent to 4.4 HP. at 100 RPM.

If couplings are required to drive in both directions special construction is necessary

# BETTER MERCHANDISING

## "Farthest North" Enjoys Electric Cooking

Dan McGrew Wouldn't Know the Old Town of Juneau  
As it is Electrified by Alaska Power Company

"Alaska!" The name alone conjures up pictures of gold rushes, Dan McGrew and the lady that was known as Lou, not to mention dog sleds and lots of movie atmosphere. It is the appropriate place in which to set Christmas scenery, at that, although the Alaska of the movies and Robert W. Service poems is not altogether the Alaska of today.

At least Juneau, Alaska, from photographs and information sent down here to "the States" by W. S. Pullen, vice-president and general manager of the Alaska Electric Light & Power Company, may be considered one of the West's most progressive communities. If the captions under the photographs did not mention Alaska, the movie-educated reader would never believe his eyes.

Upon investigation of the true facts it is learned that Alaska is declared to use more electric ranges per capita than any other state or territory of the United States.

More recent electrifications in Juneau include two new apartment houses completely equipped with electric ranges. The larger of the two, the McKinnon Apartments, has been equipped with 18 Hotpoint, type R95 electric ranges. It is arranged for 12 three-room and 6 two-room apartments, each furnished and modern in every respect, including electric lighting, cooking and emergency heating. The Fisher Apartments is a smaller building and has four apartments con-

taining electric ranges of the same type.

The Alaska Electric Light & Power Company operates a wholesale and retail electrical store in connection with its office, carrying all the appliances from flat irons to violet ray machines,

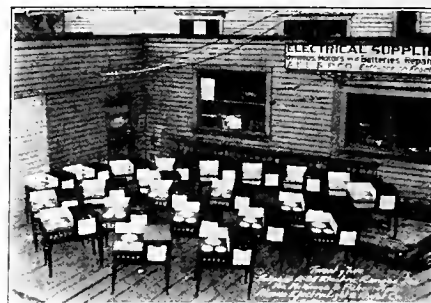


The new McKinnon Apartments, Juneau, Alaska, completely equipped with electric ranges, lighting and heating.

fixtures, electric boat supplies and motors. The company serves a population of 7,600 people from steam and hydroelectric plants.

Rates for electric energy are low, encouraging great use of electricity throughout the community. The fol-

lowing rate table was furnished by Mr. Pullen with the remark, "Needless to say, electricity for lighting, heating



Shipment of 22 electric ranges received at Juneau, Alaska, to be installed in two new electrically equipped apartment houses.

and cooking is very popular in this town and vicinity."

A copy of the revised rate card is as follows:

### ELECTRIC SERVICE RATES

Lighting Service—6-5-4 cents per kw-hr.

Heating and Cooking—2 cents summer, 2½ cents winter per kw-hr.

#### Motor Service—

\*Motors 5 to 25 hp., 3 cents per kw-hr.

Motors over 25 hp., special contract.

Special Flat Rate—Electric water heaters, \$2 per kw-month, based on 12 hour daily use, 6 a.m. to 6 p.m.

Special Electric Heater Service—May 1 to Nov. 1, \$2 per kw-month.

Minimum monthly charge on all classes of electric service, 75 cents for first 1,000 watts connected load or fraction thereof, and 25 cents for each 1,000 watts in excess of first 1,000 watts connected load.

In all cases where the connected load in all classes of electric service exceeds 20 kw., the A. E. L. & P. Co. reserves the right of making a minimum time contract.

\* No change in this rate—Same as past five years.

ALASKA ELECTRIC LIGHT & POWER CO.  
Juneau Telephone 6 Alaska

## National Merchandising Program Outlined by N.E.L.A.

Again the merchandising committee of the Commercial National Section, National Electric Light Association, has designated appliances upon which national advertising campaigns are to be launched. Dealers in appliances throughout the country are being asked to co-operate with the program in order to reap maximum benefits from the national advertising.

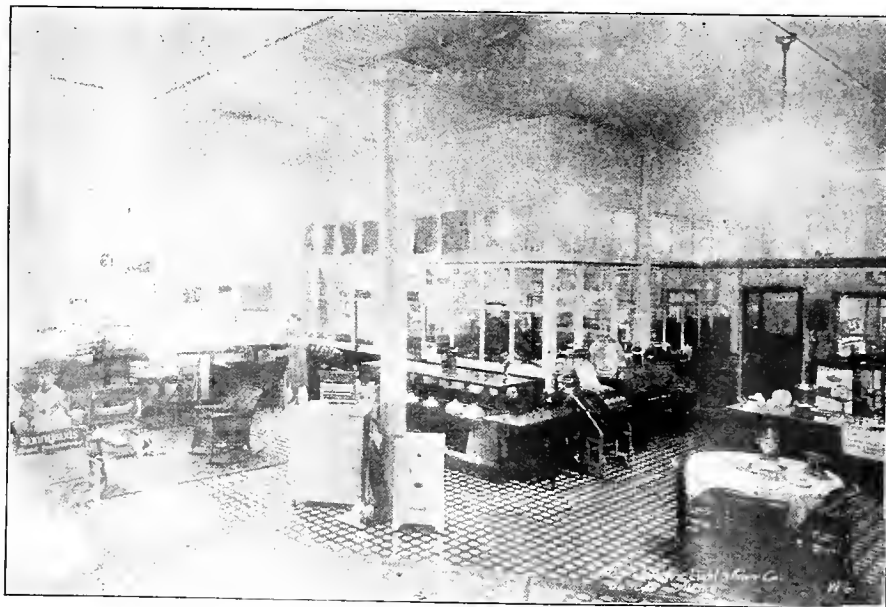
For the first three months of 1927 the program will be as follows:

February—Waffle Irons.

March—Toasters.

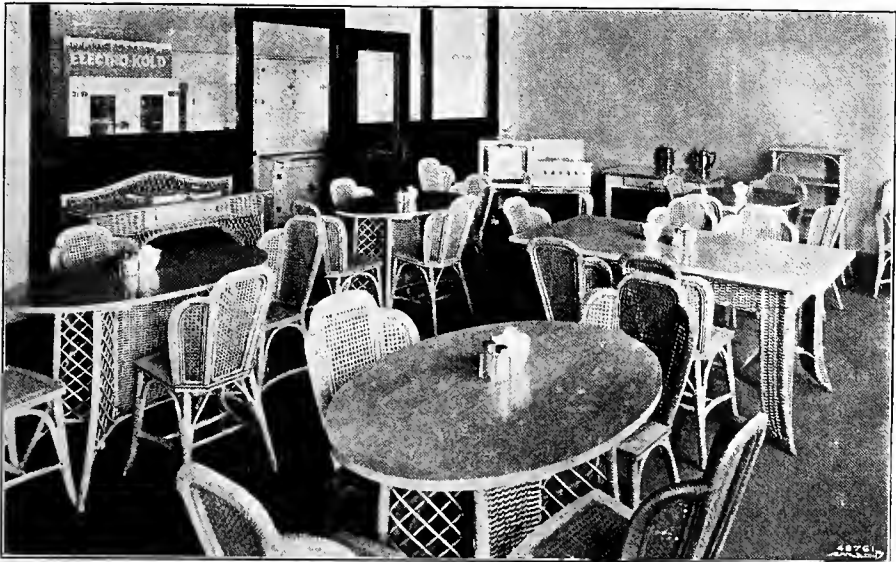
April—Percolators.

Advertising and selling helps for these appliances are being prepared both by the merchandising committee and the manufacturers of these appliances.



Hardly as one would expect to find it in Alaska is this sales room of the Alaska Electric Light & Power Company, Juneau, Alaska





Tea room of the Northwestern Electric Company, Portland. It is used for range and refrigerator demonstrations conducted weekly as well as by employees bringing their own lunches.

# Weekly Range Demonstrations Produce Sales and Good Will

By J. B. BUMAN, Appliance Sales Manager, Northwestern Electric Company, Portland

One of the features of range service rendered by the Northwestern Electric Company, Portland, takes the form of a weekly demonstration and lecture by Mrs. E. Wieser, the company's home economist. These demonstrations are held every Thursday at 2 p.m. in a special room of the building occupied by the company, throughout the months of February, March, April, May and June, and coming thus at a set time on a certain day of each week the dates can be set aside by interested housewives who must plan their days in advance. Besides attracting range customers interested in learning more about electric cookery, the company has attempted to draw to these demonstrations some of its livest range prospects, with the result that about half of the average weekly attendance of from 15 to 40 are women falling in the latter category, among whom many sales have been made.

The principal manner of advertising these demonstrations is by means of a calendar program containing an-

nouncement of two or three months demonstrations. This program lists the menu to be cooked and served on each Thursday and contains some advertising of certain ranges, refrigerators and ironers handled by the company. The programs are distributed mainly by the salesmen, each sending them to his best prospects or to customers who might be interested. A small supply is left also with dealers to give to their prospects. Thus a selected list only is reached and the booklet is not wasted on persons who might not be in the least concerned.

A different range is featured each month at the demonstrations so that all makes handled by the company are used and explained during the season. One month is given over to apartment house type of ranges and during this month special effort is made to get owners and builders or prospective builders of apartment houses in to the demonstrations. When the company is conducting a campaign on a certain make, the demonstrations

during the campaign period are made to tie in with the other advertising done and with the other effort expended.


Because proper storage of food is closely allied to its scientific preparation, Mrs. Wieser spends a part of the time of each demonstration in explaining the value of domestic electric refrigeration. A model of the refrigerator handled by the company is part of the fixed equipment of the tea room, and quite frequently a frozen dessert is on the day's menu, so that an excellent opportunity is afforded to expound the manifold uses of the machine in the home. Many of the women attending have made good use of the pencil and note book supplied by the company to take down recipes and methods, and this evidence of studious interest has lead the company to recognize that here is a fertile field in which to sow the seeds of promotion of this new kitchen load along with the range. Refrigerator sales among Mrs. Wieser's auditors have amply justified the experiment of demonstrating two appliances at the same time.

The tea room is light and airy with special fan ventilation to remove the odors of cooking. Tea tables, wicker chairs, attractive rugs and draperies contribute to the comfort of the guests, and produce a suitable atmosphere in which to show what a pleasant occupation can be made of cooking electrically. One of the ideas stressed by Mrs. Wieser is that cooking is not drudgery, but rather that it is a fine and delicate art based on exact science. From a sales point of view a psychological advantage is gained by placing the art of cooking on this high plane. The housewife is lead to understand that good cooking is one of the bases of culture, refinement and hospitality in the home, and, in fact, is an important foundation of civilization.

It remains then for the demonstrator to show that the acme of good cooking with a minimum of drudgery can be reached only by the use of the electric range. To help get this idea across, the weekly menus on the program are interlarded with pithy quotations from literature, all having to do with the desirability of being a good cook. These quotations coupled with the attractive make-up of the menus and the delightful setting supplied by the tea room do much to lend an air of studious dignity.

### Here's Your Wish

It's a *Hotpoint* Electric Range



MODERNIZE YOUR HOME WITH AN ELECTRIC RANGE

**Investigate!**

This range is all range offers, and here, it is on the Hotpoint list. The Electric Range that made high in popularity with every housewife who knows Hotpoint quality. While the offer lasts you may select a Beautiful Three-Burner Quality Appliance Set or the Wonderful Economy Cooker, the delight of every Hotpoint Range Enthusiast.

We want you. Order Today, and you will not have to wait. If you wait, we will send your range later in the season. Our offer is good until June 30th provided stock conditions will permit.

Call at our office or phone us, and we will mail you descriptive literature of the Hotpoint Range.

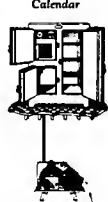
**Northwestern Electric Company**

LIGHT      POWER      HEAT

Portland, Oregon      Vancouver, Canada      Kelowna, British Columbia

### Electric Range and Refrigeration Demonstration

Calendar



"Electro-Kold" your food

There will be no demonstrations in July and August

Good cooking is an art. The good cook knows the value of the electric range, so those interested in electric refrigeration, we cordially invite you to attend these lectures.

Mrs. E. Wieser, Home Economist

Room 221 Pineock Block

**NORTHWESTERN ELECTRIC COMPANY**

444-1st Street, Portland

Front and back cover of menu and program for demonstrations.

#### THURSDAY, FEBRUARY FOURTH, 1926

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, February 4th, 1926. This menu will be served at the demonstration on Thursday, February 4th, 1926. This menu will be served at the demonstration on Thursday, February 4th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, FEBRUARY ELEVENTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, February 11th, 1926. This menu will be served at the demonstration on Thursday, February 11th, 1926. This menu will be served at the demonstration on Thursday, February 11th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, FEBRUARY EIGHTEENTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, February 18th, 1926. This menu will be served at the demonstration on Thursday, February 18th, 1926. This menu will be served at the demonstration on Thursday, February 18th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, FEBRUARY TWENTY-FIFTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, February 25th, 1926. This menu will be served at the demonstration on Thursday, February 25th, 1926. This menu will be served at the demonstration on Thursday, February 25th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, MARCH FOURTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, March 4th, 1926. This menu will be served at the demonstration on Thursday, March 4th, 1926. This menu will be served at the demonstration on Thursday, March 4th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, MARCH ELEVENTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, March 11th, 1926. This menu will be served at the demonstration on Thursday, March 11th, 1926. This menu will be served at the demonstration on Thursday, March 11th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, MARCH EIGHTEENTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, March 18th, 1926. This menu will be served at the demonstration on Thursday, March 18th, 1926. This menu will be served at the demonstration on Thursday, March 18th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

#### THURSDAY, MARCH TWENTY-FIFTH

12 o'clock

Menu for range will be featured

For the first time in the history of the Northwest Electric Company, a special menu will be served at the demonstration on Thursday, March 25th, 1926. This menu will be served at the demonstration on Thursday, March 25th, 1926. This menu will be served at the demonstration on Thursday, March 25th, 1926.

Roast Ham      Omelette      Sweet Potatoes

Corn      Carrots      Baked Stuffed Apples

Cranberry Sauce      Tea

"ELECTRO-KOLD"

Inside of menu and program, showing range of subjects covered.

## Airplane Brings Washer to Open New Factory Shop

Servicing and Sales Facilitated in Arrangements and Selling Plan of New Thor Shop in Oakland

A novel publicity stunt in which a washing machine was brought by airplane from Denver to Oakland served to give an unusual flavor to the opening of the new Thor factory branch at 2431 Broadway, Oakland, recently. The new machine received in this manner from a trainload of washing machines being shipped to the Pacific Coast, was the first to arrive in the San Francisco Bay region. It arrived in time for a sales meeting of the staff of the Oakland factory branch in its new offices.

L. B. Osborn, manager of the new shop and E. C. Sharrow, assistant manager, met the airplane and congratulated the pilot on his trip. Lieutenant William Fillmore, San Leandro's aerial traffic officer, piloted the airplane.

### Well Laid Out Shop

The new Thor factory branch has been well designed to accommodate the servicing and sales facilities required for the area served. Over 1,000 sq.ft. of floor space is used in salesroom, storeroom, loading platform, salesmen's quarters, and repair shop. The main floor is devoted to a large window display and a salesroom in which a great number of machines may be exhibited. At the rear are stairs leading to the repair shop and offices and at the back a door to the storeroom and loading platform.

The office is arranged on a mezzanine floor with a view over the sales floor. A salesmen's office is similarly placed. Adjoining it is the very complete repair shop, equipped with a spray hood for applying Duco laquer to the machines, a tool and stock parts room, and ample working quarters.

The storeroom at the rear on the main floor is so arranged that ma-

chines may be driven into the building where they may be loaded with washers to be taken out for delivery.

### Sales Plan for Two Counties.

Selling over two counties, Alameda and Contra Costa Counties, is supervised and directed from this factory branch. The territory is divided into eight zones. A zone manager is placed in charge of the sales in each zone. There are 35 dealers handling the Thor machines in the territory. Five dealers are assigned to each zone manager, who helps these dealers in making up window displays, advertising plans, demonstrations and in following up leads.

Old machines taken in trade are brought to the Oakland factory branch to be thoroughly reconditioned and then prepared for resale. Thus the dealer is freed from all service and reselling difficulties on turn-in machines. Servicing of new machines is also cared for by the factory branch representatives. All that the dealers are required to do is to procure leads and make sales.

Aside from the dealers the factory branch maintains a force of 12 salesmen who work with the dealers in making sales. Great care is exercised in the selection of salesmen of this work, only the highest type being acceptable. With better men, according to Mr. Osborn, he gets better results with less checking of results being required. Higher grade selling results in each case.

Similar Thor sales methods are employed in other divisions, according to J. W. Ferry, manager, Pacific Coast division of the Electric Household Utilities Corporation, who makes his headquarters in San Francisco.



Arriving in Oakland with the new Thor washing machine which was relayed from Denver by airplane.

## Copper Association to Push Housewiring Development

The general inadequacy of electric wiring in the great majority of American homes today represents a situation which is interesting not only to public utilities, electrical manufacturers and contractors, but to the copper industry as well.

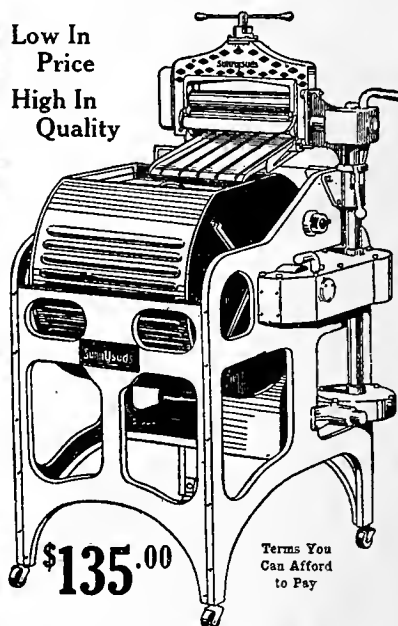
The prospect of country-wide improvement in house-wiring installations as a means for increasing the market for copper in the form of wire has attracted the attention of the Copper and Brass Research Association, 25 Broadway, New York City, which is now planning an advertising and publicity campaign addressed to the homeowner, which will stress the importance of modernizing house-wiring installations from the standpoint of convenience and better lighting.

This campaign will be conducted in similar manner to others which the Copper and Brass Research Association has been carrying on in the general building field, as for example the campaigns on brass pipe, copper leaders and gutters, and copper and bronze screen cloth.

## Smile! While You Wash

With a  
**Sunnysuds**  
Electric Washer & Wringer  
Washing Is a Pleasure

Low In  
Price  
High In  
Quality



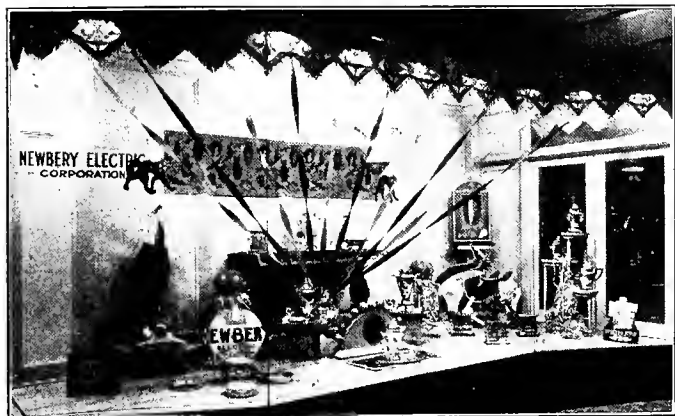
Regardless of the cost, no electric washer can give you greater satisfaction than the moderately-priced Sunnysuds. Its all-metal construction is an insurance of long life—its improved design a warranty of perfect washing action.

A Demonstration Costs You Nothing

**Blue Bird Electric Shop**

1105 Broadway A. B. CONRAD Main 3003

Advertisement used by the Blue Bird Electric Shop of Tacoma in a recent washer sale. This company makes good use of newspaper advertising, including classified ads.



The Newbery Electric Corporation, Los Angeles, can always be counted upon to produce attractive seasonal window displays, as this Hallow'e'n window shows.



Recent window display of products of the Majestic Electric Appliance Company exhibited in the window of the Great Western Power Company, San Francisco.

Above at right: Porcolator advertisement of power company with dealers co-operating.

DON'T MISS THIS ONE!!

Big Money-Saving

# Percolator Event

An Outstanding Value

Featured at Only -7-

**\$1.95** DOWN-  
Balance in Two Equal Monthly Payments

**\$5.95**

A dependable quality made by Landers, Frary & Clark makers of "UNIVERSAL" Electrical Appliances, Fine Cutlery and Hardware

This percolator is equipped with the famous "UNIVERSAL" automatic percolator pump and protective fuse. Its perfect action, efficiency, ruggedness and sanitary construction makes it a value doubly worth while.



**Guaranteed**  
This Percolator is Guaranteed to Render Satisfactory Service

This Percolator is protected by this handy little Element Safety Fuse

IT IS A LARGE 7-CUP SIZE

Sale Starts SATURDAY APRIL 24

## The Very Best Quality, Highly Polished Aluminum Electric Percolator Priced at Only \$5.95

More people get a bad morning start and more good days are ruined due to a poor cup of breakfast coffee than any other cause. Start the day right. Here's your opportunity to get the right Percolator.

This Percolator was selected after a careful study of many Percolators submitted by a number of the largest appliance manufacturers in the United States—therefore we believe it is the best value obtainable.

### It's a Percolator You'll Use Every Day

—It is not a luxury, but an every-day percolator for every-day use. It is a high-grade article priced in reach of everyone.

### FOR BETTER FLAVORED COFFEE

—It extracts the full flavor from the ground coffee without any bitterness. —With ordinary care, and everyday use, it will retain its finish for years.

### A Beautiful Design With Pannelled Sides

—With the graceful, Colonial Pannelled sides and the highly polished aluminum surface it presents an appearance fitting for any occasion.

The Midland Counties Public Service Corporation has made it possible for you to purchase these Percolators from the following dealers:

- |  |  |   |  |
|--|--|---|--|
| PASO ROBLES ELECTRIC SHOP<br>Pasadena, Calif.  | JOHN B. HURST<br>Alhambra, Calif.                | HOLMES ELECTRIC SHOP<br>Pasadena, Calif.      | THE ELECTRIC SHOP<br>Santa Maria, Calif. |
| GUARANTEE ELECTRIC SHOP<br>Pasadena, Calif.    | CLYDE'S ELECTRIC SHOP<br>San Luis Obispo, Calif. | TURNEY ELECTRIC SHOP<br>Arroyo Grande, Calif. | W. E. ROBERT<br>Lompoc, Calif.           |
| SAN MIGUEL ELECTRIC SHOP<br>San Miguel, Calif. | VALLEY ELECTRIC CO.<br>San Luis Obispo, Calif.   | KRELL ELECTRIC CO.<br>Santa Maria, Calif.     | CREATH BROS.<br>Morro Bay, Calif.        |



Sales floor of the Winnipeg, Canada, Power Company.



# NEWS OF THE INDUSTRY

## Edison Company Completes Lower Half of Vincent Line

Marking the completion of the construction work on the southern half of the third 220-kv. transmission line of the Southern California Edison Company, E. R. Davis, manager of construction for the company, on Nov. 21 closed the switch at Magunden substation, six miles east of Bakersfield, that energized the new line and brought it into active use as a part of the great network of electric lines through which the company serves southern and central California. This line, known as the Vincent line, will be built through to connect with the series of hydroelectric plants situated on the Big Creek and San Joaquin Rivers in the northeastern part of Fresno County.

This 95-mile line has required almost one full year to construct, and has cost, with necessary switching facilities, approximately \$2,500,000, which includes the cost of building roads, constructing telephone lines and the purchase of the necessary rights-of-way.

In addition to the construction work in connection with the building of the new line, it was necessary for the company to spend approximately \$400,000 at Magunden substation to make it ready to handle the additional load which the new line would put upon it.

The Vincent line, on which an exceedingly large-sized cable has been used as a conductor, will have a capacity of slightly more than 150,000 kva. This is more than the combined capacity of the two original 220-kv. lines now in operation between the Big Creek-San Joaquin project and southern California. Work on the northern half of the Vincent line will be pursued diligently, and it will be ready for operation early in 1928, coincident with the completion of the fifth hydroelectric plant on the Big Creek-San Joaquin project.

## Industrial Lighting Program for 1926-1927 Announced

The industrial lighting committee of the National Electric Light Association has announced that in order to gain the greatest benefit from the Industrial Lighting activity conducted last year it is proposed that a follow-up campaign be inaugurated for 1926 and 1927.

The committee now is preparing an "Industrial Lighting Fact Book" which, in the words of the announcement, "will contain a fund of information that will be of assistance to the local companies in organizing and conducting industrial lighting campaigns for many years to come." This prospectus will contain complete summation of the experiences gained by central stations in promoting industrial lighting problems last year, together with sugges-

tions of manufacturers of industrial lighting equipment and Mazda lamps. The fact book will give detailed results of community activities, showing exactly how results were best obtained. It will contain also the national advertising plan and the new series of advertisements, a chapter on the organization of local companies, the new plan of the Chicago Electrical Association, illustrations of direct-mail helps available, and the many other means available to promote the sale of industrial lighting equipment.

The proposed industrial lighting advertising campaign, summarized, will accomplish the following: Be a continuance or follow-up of the successful 1925 Industrial Lighting Activity; keep the story of the benefits of industrial lighting before factory executives; back up central stations in their industrial lighting activities; assure the continued increase in the sale of industrial lighting equipment and load.

One thousand dollars will be distributed in prizes covering \$500 for the first prize, \$300 for the second, and \$200 for the third.

## Utah Associated Industries to Study Colorado River

Believing that the proper development of the Colorado River can go ahead only after the entire West, and especially the states within the river basin, have reached a unified decision on the matter, the Utah Associated Industries has undertaken a study of the development problems of the river.

In accordance with this plan letters soliciting interest in and support of its successful consummation have been sent to economists, reclamationists, public officials and business men in most of the states of the West by J. G. M. Barnes, president of the Utah Associated Industries.

## Red Seal Kitchen Exhibited by Power Company at Fair

At the recent San Diego County Farm Bureau Fair the booth of the San Diego Consolidated Gas & Electric Company represented a model Red Seal kitchen, with a demonstration booth adjoining.

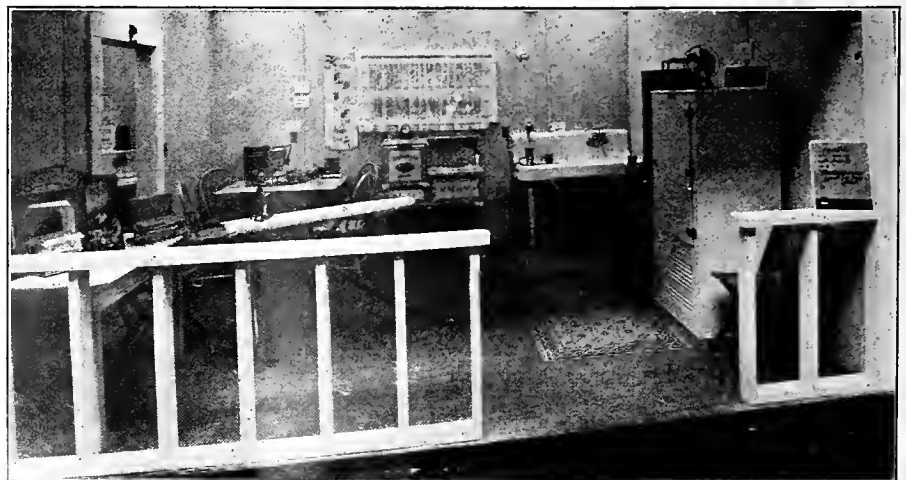
The electrical appliances connected to show the proper operation in the Red Seal kitchen included range, water heater, refrigerator, percolator, waffle iron, iron, toaster, table stove, immersion tumbler heater, fan, mixer, fireless cooker and cigar lighter.

The demonstration kitchen also was equipped with suitable mixing table and serving counter where the visitors might taste of the electrically cooked food. The Model Red Seal Kitchen, in addition to the electrical appliances listed, was equipped with a breakfast nook, ironing board, kitchen sink, and a display table.

In conjunction with this display visitors were requested to sign their names and addresses together with the electrical appliance in which they were most interested, on individually numbered cards. The stub of the card was retained by the visitor and the original deposited in a drawing box. The last night of the fair one card was drawn from this box to designate the winner of an electric percolator donated by the San Diego Consolidated Gas & Electric Company.

At present the San Diego Consolidated Gas & Electric Company is not in the appliance business other than selling electric ranges and water heaters, but these cards furnished a number of prospects for ranges, which when followed up netted a large number of sales.

The chief object of this display was to educate the public along the lines of adequate kitchen wiring, in conjunction with the Red Seal Plan.



Model Red Seal Kitchen exhibited at County Farm Bureau Fair by the San Diego Consolidated Gas & Electric Company



## Two Well Known Central Station Men Are Accorded Distinctive Promotion

Recognition of ability in the form of distinctive promotion has been accorded two central-station men well known in the electrical industry in the West—James B. Black, vice-president and general manager of the Great Western Power Company of California, San Francisco, and A. Emory Wishon, vice-president and general manager of the San Joaquin Light & Power Corporation, Fresno, Calif.

Announcement has been made that Mr. Black will join the New York organization of The North American Company as vice-president of the Western Power Corporation shortly after the

one of the youngest central-station executives in the country, entered the commercial department of the Great Western Power Company immediately after his graduation from the University of California in 1912. Six years later he was made general sales manager, and in 1922 general manager. In 1924 he was promoted to the vice-presidency, retaining also the position of general manager. Mr. Black has taken an active part in the affairs of the industry, having served as vice-president and president of the Pacific Coast Electrical Association and as a member of its executive committee.



J. B. BLACK



A. E. WISHON

first of the year. He will continue to maintain his connection with the organizations of the Great Western Power Company of California, San Joaquin Light & Power Corporation and Midland Counties Public Service Corporation, the operating subsidiaries of the Western Power Corporation which comprise the California properties controlled by The North American Company. He will be succeeded by Mr. Wishon, who also will continue to occupy his present post with the San Joaquin corporation.

Since the acquisition of the San Joaquin Light & Power Corporation and the Midland Counties Public Service Corporation in 1924 by the Western Power Corporation, the activities of those companies and the Great Western Power Company of California have been carried on in close co-operation. The construction of the Brighton-Merced 220-kv. steel-tower transmission line and Wilson substation, placed in operation in July of this year, effected the physical interconnection of the companies, and since that date their production and transmission properties have been operated practically as one system. The two properties have had a joint purchasing department for some time, and it is understood that as time goes on further departmental consolidations will take place under the new setup looking toward a single executive control for both properties.

The president of the Western Power Corporation is H. P. Wilson; A. G. Wishon is president of the San Joaquin Light & Power Corporation, and Guy C. Earl is president of the Great Western Power Company of California.

Rapid progress in the electrical industry has characterized the careers of both J. B. Black and A. E. Wishon. Mr. Black, who has the honor of being

He was also formerly a member of the advisory board of the California Electrical Bureau. At the present time he is a member of both the P.C.E.A. Public Policy and Public Relations Sections.

Mr. Wishon, whose new duties make him the operating head of both the Great Western Power Company and the San Joaquin Light & Power Corporation, entered the employ of the latter company in 1910 as assistant general manager in charge of the southern district. Three years later he was made assistant general manager over all properties of the company, and in 1920 became general manager. In 1925 when the Western Power Corporation acquired control of the San Joaquin company Mr. Wishon assumed additional responsibilities as vice-president of the latter company. One of the leaders of the electrical industry in California, he is a past president of the Pacific Coast Electrical Association and past chairman of the customer-ownership committee of the N.E.L.A., and at present is a member of the Public Policy Section of the P.C.E.A. His activities in connection with customer-ownership and customer-relations have made him prominent not only in the industry on the Pacific Coast but nationally. Mr. Wishon was graduated from the Missouri School of Mines and Metallurgy in 1908.

### Aerial Survey Finds Water-Power Possibilities in Alaska

In co-operation with the Department of the Interior a Navy Aerial Survey expedition recently was sent to Alaska to obtain information on the possibilities of water-power development in that territory. The expedition mapped fifteen islands and the Cleveland penin-

sula as well as a part of another large island in two days, and its report states that a large lake, locally known as Lake Grace, has been shown by photographic work to hold excellent possibilities for the development of great water power.

In making these aerial surveys two planes working together make two flights daily. In this way it is possible to map in a few days territory that would take years by the old methods of surveying, and the result is a continuous photograph of the land and water.

### Seven New Electric Ferry Boats for San Francisco Bay

The increasing trend toward diesel-electric propulsion for ferry boats is shown by the fact that at the present time seven electrically driven ferry boats are being built for service on San Francisco Bay. Two of these are for the Key System Transit Company; three are for the Golden Gate Ferry Company, and two will be in the service of the Southern Pacific Company.

The propelling and auxiliary equipment for the three boats for the Golden Gate company will be furnished by the Westinghouse Electric & Manufacturing Company. The propelling machinery for each boat will consist of two 950-hp., 750-volt, 150-100 r.p.m. single armature, separately excited, shunt-wound; three 270-kw., 250-volt, 265-r.p.m. main generators with differential series, and separately excited shunt fields; three 40-kw., 115-volt, 265-r.p.m. compound wound exciters; one complete switching and control equipment with engine room and double pilot house control stations. The propelling motors, main generators and exciters are of the open, self-ventilated type and will be of exceptionally rugged construction.

Each of the three main generators will be driven by an Ingersoll-Rand, 4-cycle, solid injection diesel engine, an exciter being directly connected to each main generator.

The main switchboard will be located in the engine room and will carry all the instruments, field rheostats, switches, etc., for the propelling equipment, and, in addition, the main controller for the engine-room control station.

The auxiliary motors will be of the Westinghouse enclosed, self-ventilated type, developed especially for marine service and controlled by enclosed marine-type, magnetically operated controllers.

The ships will be heated electrically throughout by the latest enclosed marine type heaters, arranged for low, medium and high heat.

Each of the ferries for the Southern Pacific Company, also of the double-ended type, will have four diesel engines as prime movers. The main propelling equipment, also to be furnished by the Westinghouse company, for each ship will consist of two 1,250-hp., 500 volts per armature, 100-130 r.p.m., shunt wound, separately excited, double-unit, self-ventilated motors; four 275-kw., 250-volt, 230-r.p.m., shunt wound, separately excited main generators; four 40-kw., 125-volt, 230-r.p.m., compound wound exciters, each directly connected to a main generator; one complete switching and control equipment with engine room and double pilot house control stations.

## General Electric Company Agency System Held as Legal

Washington Correspondence

In a recent decision handed down by Chief Justice Taft the United States Supreme Court sustained as legal the agency system for distribution of incandescent lamps of the General Electric Company and declared valid and legal the license granted by that company to the Westinghouse Electric & Manufacturing Company. The effect of the decision is to hold legal the system by which the General Electric Company controls the resale price of incandescent lamps.

The federal government brought suit against the General Electric Company, the Westinghouse Electric & Manufacturing Company, and the Westinghouse Lamp Company in the northern district of Ohio, charging a violation of the Sherman Anti-Trust Law. The district court dismissed the bill for want of equity and this decision is affirmed by the supreme court.

In its suit the government charged that the defendant companies were evading a consent decree entered some years ago in a suit against the General Electric Company and other corporations in which restraint of trade had been alleged. It was charged under the later suit that the General Electric Company had what tended to be a monopoly on the sale of incandescent lamps through its agency system and that it used such system to fix resale prices illegally. In the second place, it was charged that it was achieving the same purpose through control of licenses for the manufacture and distribution of such lamps by the other defendants.

The decision by the supreme court goes into considerable length in reviewing the stipulation of facts before the lower court. It asserts that, although the agents of the General Electric Company distributing incandescent lamps are merchants, there can be no doubt that their relations to the corporation are those of agents of the company. This is established, the

opinion states, by the fact that the General Electric Company pays freight on the lamps, carries insurance against them while they are in the stock of its agents, does not collect from the agents until lamps are sold to consumers, etc. The company therefore may dictate prices on its lamps until they are sold by its agents, the court holds.

The relationship between the General Electric Company and the Westinghouse Electric & Manufacturing Company, including the latter's subsidiary, the Westinghouse Lamp Company, are those between the owner of a patent and one licensed by the patentee, the court states. Under patent law, the court points out, it is possible for the owner to make stipulations with the licensee and hence the court finds nothing illegal in the stipulation which the government charged caused the Westinghouse company and its subsidiary to carry on the same general policies in regard to incandescent lamps that had been adopted by the General Electric Company.

## Arizona Applies for Permit for Colorado River Project

The board of directors of state institutions for Arizona has applied to the Federal Power Commission for a preliminary permit covering a project on Colorado and San Juan Rivers in Cococino County, Ariz., and San Juan County, Utah. Under the resolution of the commission of Oct. 28, 1926, no consideration will be given this application or any others involving streams in the basin of the Colorado.

The Arizona officials in their application state that they propose to build a dam 693 ft. high at Glenn Canyon site No. 1, which is 4 miles above Lee's Ferry. Such a dam would back up water for 205 miles. The application states that this dam and reservoir are to be an integral part of the Arizona high-line reclamation project. The power is to be used "to supply the power markets of Utah, Colorado, New Mexico and Arizona."

## Final Returns Show 4 to 1 Vote Against Housewives Bill

Final returns on the Oregon Water and Power Board Development measure, the so-called Housewives' Bill, as announced officially show that the proposed measure was defeated on Nov. 2 in every county in the state. The vote against it ranged in ratio from 8.2 to 1 in Jackson County to 2.4 to 1 in Columbia County, the average being 4.2 to 1. The returns by counties are given below:

County	Yes	No.	Total	Ratio Against
Jackson	729	5,998	6,727	8.2 to 1
Grant	140	1,126	1,266	8 to 1
Linn	747	5,556	6,303	7.4 to 1
Marion	1,482	10,538	12,020	7.2 to 1
Benton	429	3,027	3,456	7 to 1
Wallowa	200	1,350	1,550	6.75 to 1
Union	514	3,409	3,923	6.6 to 1
Lane	1,238	7,716	8,954	6.3 to 1
Baker	602	3,701	4,303	6.1 to 1
Sherman	103	597	700	5.8 to 1
Coos	765	4,333	5,098	5.65 to 1
Douglas	780	4,294	5,074	5.5 to 1
Polk	537	2,969	3,506	5.5 to 1
Lake	142	771	913	5.4 to 1
Gilliam	124	672	796	5.3 to 1
Josephine	342	1,807	2,149	5.25 to 1
Curry	100	464	564	4.65 to 1
Yamhill	849	3,904	4,753	4.6 to 1
Wheeler	104	457	561	4.4 to 1
Malheur	282	1,245	1,527	4.4 to 1
Tillamook	479	2,276	2,755	4.25 to 1
Deschutes	500	2,118	2,618	4.2 to 1
Umatilla	863	3,531	4,394	4.1 to 1
Crook	153	611	764	4 to 1
Klamath	785	2,714	3,499	3.45 to 1
Lincoln	416	1,434	1,850	3.45 to 1
Multnomah	15,028	51,134	66,162	3.4 to 1
Clackamas	2,081	6,872	8,953	3.3 to 1
Jefferson	112	364	476	3.25 to 1
Harney	211	656	867	3.1 to 1
Washington	1,292	4,036	5,328	3.1 to 1
Morrow	243	722	965	3 to 1
Hood River	354	1,139	1,523	2.95 to 1
Clatsop	1,035	2,757	3,792	2.7 to 1
Wasco	825	2,100	2,925	2.55 to 1
Columbia	697	1,694	2,391	2.4 to 1
Totals	35,313	148,092	183,405	4.2 to 1

## Experimental Dam Tested by Flood Due to Heavy Rain

Early seasonal rains in the high Sierra of California covering the watershed of Stevenson Creek across which Engineering Foundation's experimental arch dam now stands subjected the dam to a test which had not been on the original schedule.

Because of the unusual volume of this precipitation great quantities of water were liberated from the Shaver Reservoir above Stevenson Creek, in the estimated amount of 1,500 sec.-ft. and this water was augmented by the water from the drainage area between Shaver Reservoir and the experimental dam. Although the under-sluice at the dam had been left open, debris picked up by the unusual amount of water in the stream caused the under-sluice to become clogged and the water passed over the crest of the dam at a depth which was estimated to be about three feet. This flow continued for a number of hours. Practically all the scaffold on the lower side of the dam was demolished and all wires leading from the telemeters on that face of the dam were torn loose. Water was still passing over the dam to a depth of a few inches on Dec. 2, but such examination as was possible indicated that there had been no damage to the structure itself.

It will be recalled that the dam is 60 ft. in height, 7½ ft. thick at the base, 2 ft. thick at 30 ft. above the base and of constant thickness of 2 ft. between 30 ft. and 60 ft. of height. Length of the crest is 140 ft. and the upstream face is vertical with a constant radius of 100 ft. There is no steel reinforcement.



Huntington Park substation of the Southern California Edison Company, which has just been completed, ultimately will have a capacity of 18,000 kw. The bronze tablet alongside the entrance bearing the names of the substation and the company is the only identifying mark. The cost was approximately \$150,000.

## Lighting Is Important Factor in Staging of "The Miracle"

Of interest to the electrical industry is the use of lighting to achieve dramatic effects in "The Miracle," declared to be one of the most spectacular and elaborate stage productions on record. This pageant drama, staged by Max Reinhardt and produced in America under the direction of Morris Gest, is to be presented at the San Francisco Civic Auditorium and again in Los Angeles. The San Francisco production is set for Dec. 27, and the auditorium is to undergo elaborate changes in order that the drama may be presented to the best advantage.

The spectacle is entirely in pantomime, there being no dialogue to carry the story. Lighting, therefore, is used as one of the chief factors in the spectacle to convey the sense of the action at all times.

Electrical control of all effects has been elaborately worked out. The chief electrician directing these effects will be stationed in the balcony of the auditorium and will give directions by means of telephone to the electricians stationed in various parts of the stage.

By ingenious means lighting is used to change the scene completely from cathedral to forest. Numerous motor applications to provide for the various effects called for also make the production one seldom equaled in the use of mechanical equipment. Four electric motors totaling 80 hp. control the mechanical operation of the scenic equipment; 22½ miles of cable of various sizes are required for the lighting; the setting is illuminated from lamps concealed in columns and between the banners on the balcony rails. Twelve portable switchboards are used to control the 440 high-powered spot lamps and 1,500 star lamps. Five hundred and ten electric candles on individual switches also are used, and 120 stereopticon lamps are available individually, collectively or in units.

## Glines Canyon Notable Automatic Hydroelectric Station

What is claimed to be the largest single-unit automatic hydroelectric generating station now is under construction by Thebo, Starr & Anderton of San Francisco for the Northwestern Power & Light Company, Port Angeles, Wash. This station, known as the Glines Canyon power house, is being erected on the Elwha River 11 miles from Port Angeles to furnish power for the Washington Pulp & Paper Company's plant in that city. The plant is expected to be put in operation early in 1927.

Generating equipment will consist of a 17,500-hp., vertical-shaft Francis turbine furnished by the Pelton Water Wheel Company, driving a 13,333-kva., a.c., 6,600-volt, 3-phase, 60-cycle, 225-r.p.m., vertical generator with directly connected exciter. Generator, three 4,500-kva. outdoor-type transformers, necessary switching and all other electrical equipment will be supplied by the General Electric Company. Through selector supervisory equipment the operator at the Elwha station 7 miles distant will give starting and stopping indications and supervise the running of the automatic plant.

## Salt River Valley Water Users Contract to Sell Power

A contract for the sale of hydroelectric power to the extent of about \$250,000 a year has been made between the Salt River Valley Water Users' Association and the Nevada Consolidated Mining Company, of which the Ray Consolidated Copper Company now is a part. Connection with the present lines of the association will be made by building from Superior to Ray, a distance of about fifteen miles.

The Ray company has started upon construction of a service line from its power plant at Hayden, up the Gila River Canyon, about 30 miles, to the site of the new Indian Bureau Coolidge Dam near San Carlos.

Early in 1927 the Salt River Valley Water Users' Association will have a large surplus of electric current available from the Horse Mesa Dam, now under construction. At the present time it has a market to the extent of about \$750,000 a year from the electrolytic works of the Inspiration Consolidated Copper Company at Miami, Ariz.

## N.E.L.A. Announces Enlargement of Engineering Staff

Two young engineers with from three to five years operating experience are desired by the National Electric Light Association to fill positions created by the proposed expansion of its engineering department activities. One of the new positions is designed for research into overhead systems problems and the other for inductive co-ordination research.

This presents an opportunity for two enterprising young engineers who may be interested in the work involved. Both positions include office and field duties and incident traveling. Applications should be sent directly to Major H. S. Bennion, director of engineering, N.E.L.A., 37 West 39th Street, New York City.

## Northwest Utility Announces Contest for Employees

As a result of the interest shown in the recent suggestion contest among employees of the Puget Sound Power & Light Company, Seattle, the company has decided again to offer substantial prizes in a similar contest. The new contest, which commenced Oct. 1 and will close May 1, 1927, offers \$1,000 in cash to the best five "suggestions or plans submitted to cover subjects which are of such a practical nature that adoption by the company would probably result in an increase of gross earnings or a decrease of operating expenses, or a well defined company policy which will clearly indicate increased efficiency throughout the organization or better relations with the public in the territory served." The prize money is divided as follows: \$400, \$250, \$200, \$100 and \$50.

In the former contest announced in July, 1925, and ending in June of this year, three prizes, \$500, \$300 and \$200, were offered. After careful consideration of many excellent suggestions, awards were made to C. S. Reynolds, supervisor of public relations, southwestern district, Tacoma, first, for a suggestion for a "Simplification of Rural Extension Policy"; A. C. Riggs, superintendent of light and power, northern district, Bellingham, Wash., second, for a suggested system of "Cost Analysis by the Use of Charts;" and A. R. Haines, central district, Seattle, third, for "A Complete Analysis of Hydroelectric Station Operation." In addition, honorable mention was given to suggestions by O. O. Rutledge, southwestern district, and L. J. Pierce, central district; and special mention to those by Mrs. M. L. Redward, northeastern district, Everett, Wash., F. E. DeSilvia, central district, L. Robertson, central district, M. T. Crawford, central district, and J. J. Mersom, southwestern district.



Electric locomotive soon to be put in service by the Great Northern Railroad in the Cascade Mountain section in Washington.

## Electric Locomotive for Service in Cascade Mountains

The electric locomotive shown in the accompanying illustration soon will be placed in operation by the Great Northern Railroad in the Cascade Mountain section in Washington. This engine, said to be the world's largest motor-generator locomotive, is capable of hauling trains consisting of as many as 200 cars.

Having transformers and motor-

generators included as part of its electric equipment, the locomotive utilizes high-voltage alternating current on the trolley to drive direct-current traction motors, thus providing the highest efficiency from the standpoint of electric transmission and motor drive. It can exert 7,000 hp. under maximum conditions and has a continuous rating of more than 3,500 hp. The locomotive was built by the Westinghouse Electric & Manufacturing Company.

## Huntington Beach Substation to Be Started at Once

Work is to begin immediately on the construction of a new substation for the Huntington Beach territory of the Southern California Edison Company. This station, which will cost approximately \$135,000, is to be located about four miles north of the city of Huntington Beach, at the corner of Wintersburg Avenue and B Street.

The electrical installation will consist of four sections of 60-kv. rack, seven sections of 11-kv. rack, four 2,000 kva. transformers, 60/11 kv. Four 15-kv. lines, two 4-kv. lines, and one street light circuit will be fed from the station.

The building will be of brick and will be 20 x 46 ft. An operator's cottage and a combination garage also are to be built on the site. In keeping with the policy of the company the grounds will be carefully landscaped and everything done to make the installation beautiful as well as useful.

## Two Equipment Contracts Let Recently in Seattle

Contract for furnishing motors to be installed in the \$250,000 plant under construction in Tacoma by the Osgood Panel & Veneer Company has been awarded to the Seattle branch of the Allis-Chalmers Manufacturing Company. The award includes twelve Timken tapered roller bearing motors ranging from 75 hp. down.

Another contract recently let in Seattle covers equipment for three radio broadcasting stations to be built for the Northwest Radio Service Company in Seattle, Portland and Spokane. It was secured by R. R. Poppleton, Inc., of Seattle, and includes nine 15-kva. transformers, five 5-kw. motor-generators, and a number of circulating pumps.

## Two San Francisco Firms Plan Paper Mills in Alaska

Further evidence of the fact that American newspapers are beginning to look to Alaska for their supplies of print paper is shown by the application to the Federal Power Commission by George T. Cameron, publisher of the San Francisco Chronicle, for a preliminary permit covering a power project on Crater and Long Lakes in Alaska. The power is to be used for the operation of a news print paper mill. This application is in conflict with one which has been filed by William Randolph Hearst. It reveals that Mr. Cameron plans to erect at the earliest possible date a 200-ton news print mill. Eventually he expects to increase the capacity to 500 tons daily. The application makes no estimate of the amount of power which will be available.

I. and J. D. Zellerbach, also of San Francisco, have applied to the Federal Power Commission for a preliminary permit covering a project on Revillagigedo Island, Alaska. The power is intended for use in the operation of a paper and pulp mill to be established near the head of Thorne Arm. The applicants propose to make an ultimate installation of 86,000 hp.

## N.E.L.A. to Co-operate with U.S. Weather Bureau in Survey

The U.S. Weather Bureau has agreed to co-operate with the National Electric Light Association in a meteorological survey to develop more facts with regard to sleet storms, glaze formations and wind pressures and some of their characteristics.

A mass of records is available at the Weather Bureau, but these will have to be supplemented by special observations. The bureau has made available to the association the detailed records of past sleet storms and

has agreed to instruct its local offices to take additional observations.

The purpose of the proposed survey is to determine more accurately the factors of safety of existing types of overhead lines so that they may be strengthened if necessary or may be cheapened if it should develop that it can be done without danger.

## News Briefs

**U. S. Geological Survey Reports on Power Production.**—A report by the U. S. Geological Survey on the production of electric power in the United States for the months of July, August and September, shows that the total electric power produced by water power in the country, measured in thousands of kilowatt-hours, was 6,160,270. For the Pacific States the figures given were as follows: July—724,559; August—672,699; September—620,818; or 2,018,076 thousands of kilowatt-hours. For the Mountain states the following figures were reported: July—252,970; August—261,402; September—245,508, or 759,880 thousands of kilowatt-hours.

**El Paso Company Receives Special Mention in Coffin Award.**—In the awarding of the Coffin Medal for 1926 the El Paso Electric Railway of El Paso, Texas, received special mention and was among the five companies finally considered for the award. The Pennsylvania-Ohio Electric Company, Youngstown, Ohio, was the winner.

**Alien Land Law Put in Effect in Japan.**—An ordinance making effective the alien land law in Japan was promulgated Nov. 3, to become effective Nov. 10, according to report of the American ambassador at Tokyo. After that date all foreign nationals without exception will enjoy land ownership rights throughout Japan except in certain designated areas "necessary for national defense."

**Distributing System of Ostrander, Wash., Taken Over by Puget Sound Company.**—The Ostrander Railway & Timber Company's electric distributing system at Ostrander, Wash., has been taken over by the Puget Sound Power & Light Company. The latter plans to rebuild the system and extend service north and south along the Pacific Highway, according to B. M. Atkins, local manager.

**Puget Sound Company to Build New Power Cable Across Hood Canal.**—The Puget Sound Power & Light Company at Port Angeles, Wash., has been granted franchise to furnish power to existing and future industries on the Olympic peninsula. It plans to spend \$60,000 in building a new power cable across Hood Canal and in equipment to reach the plants in that vicinity.

**Colorado Voters Defeat Proposed Measure for Control of All Utilities.**—At the state election Nov. 2 Colorado voters defeated four to one a proposed amendment vesting a newly created state commission with complete jurisdiction over all utilities except those municipally owned. Colorado is one of the few states where regulation of public utilities is divided between the state commission and a few "home rule" cities.

## Northwest Electric Light & Power Association

### Accounting Section Committee Chairmen Are Appointed

Committee chairmen appointments in the Accounting Section as confirmed to date are announced by the section chairman, W. L. Fitzpatrick, general auditor, Mountain States Power Company, Tacoma, as follows: purchasing and storeroom committee—E. I. Snyder, assistant auditor, Portland Electric Power Company, Portland; classification of accounts committee—C. F. Kirchain, staff accountant, Puget Sound Power & Light Company, Seattle; general records committee—R. H. Jones, assistant treasurer, Utah Power & Light Company, Salt Lake; statistical methods committee—D. F. McCurrach, statistician and rate engineer, Northwestern Electric Company, Portland.

Confirmation has not yet been received in the appointment of a chairman for the customers' records committee. No appointment of a fixed capital committee will be made this year.

### Engineering Section Personnel Changes Announced

F. J. Rankin, formerly chief engineer of the Idaho Power Company, Boise, has resigned as chairman of the Engineering Section to accept a position in New York. O. L. LeFever, general superintendent of the Northwestern Electric Company, Portland, has accepted appointment to the chairmanship succeeding Mr. Rankin.

Mr. LeFever, who was formerly chairman of the hydraulic power committee, has appointed C. P. Dunn, of the Portland Electric Power Company, to succeed him as chairman of that committee.

**Dates Announced for Midwinter Meeting of Commercial Section.**—The midwinter meeting of the Commercial Section, Northwest Electric Light & Power Association, will be held Feb. 10-11, 1927, at the Multnomah Hotel, Portland.



**Large Frequency Changer Ordered by Edison Company.**—An order for a synchronous frequency changer set, said to be the largest in the world of the 50 to 60-cycle type, has been ordered by the Southern California Edison Company from the Westinghouse Electric & Manufacturing Company. This set will be rated 30,000 kva. and will operate at 600 r.p.m. It will be equipped with two direct-connected exciters, two Griscom-Russell air coolers, starting auto transformers and regulating equipment. The frequency changer is to be installed in the Rector substation.

**Seattle Plans Sale of Municipal Utility Bonds on Installment Basis.**—Sale of city utility bonds on the installment plan over the counter is proposed by the city council of Seattle, Wash. It is planned to issue \$400,000 of the \$3,400,000 Skagit issue for the Diablo dam recently authorized in small denominations and offer it for sale.

**Preliminary Index to River Surveys Ready for Distribution by Geological Survey.**—The Department of the Interior recently has published a preliminary index to river surveys which have been made by the Geological Survey and other agencies. This report (Water-Supply Paper 558), compiled by B. E. Jones and R. O. Helland, lists by states the rivers that have been surveyed, gives a brief description of the maps, and states where copies may be obtained. The report should be of value to engineers, commissions, and other agencies that are dealing with problems related to the rivers of the United States. A few copies of this report are available for free distribution by the Geological Survey. After this stock is exhausted the paper may be purchased from the Superintendent of Documents, Washington, D. C., for 25 cents a copy.

**Charleston, Wash., Tables Ordinance for Municipal Power Plant Purchase.**—The city council of Charleston, Wash., has tabled an ordinance calling for the contemplated purchase of a municipal electric power plant, after weeks of effort to come to a decision. When the council was advised that the preliminary figure of \$75,000 in bonds carried in the ordinance probably would not be more than half enough to establish a plant, it was decided to table the ordinance. Norwood Brockett, director of public relations of the Puget Sound Power & Light Company, presented figures which showed that the town could not purchase and operate a light plant at lower rates to users and succeed below an annual deficit of \$23,000.

**Power Unit Taxing Change Proposed in Plumas and Butte Counties, Calif.**—A movement designed to put operating properties of power companies back upon county assessment rolls has been placed before the supervisors of Butte County, Calif., by the Plumas County board for approval. According to Plumas County officials, mountain counties where hydroelectric plants have been built are discriminated against under the present mode of taxation. The movement is not designed to collect more taxes from electric utility corporations, Plumas authorities maintain, but it is urged that the method of taxation be changed so that these counties would be compensated for the loss of this taxable property.

## P.C.E.A. News

### Engineering Section is to Meet in S. F. Jan. 12-14

Members of the Engineering Section of the Pacific Coast Electrical Association are to gather at the Fairmont Hotel in San Francisco for a three-day session Jan. 12-14, 1927. This is the regular midyear meeting of the section.

One of the outstanding features of the session will be the joint meeting with the San Francisco Section of the American Institute of Electrical Engineers. This joint meeting will be held following the close of the business sessions Friday evening, Jan. 14, 1927, at the Ryan Laboratory at Stanford University. To facilitate matters the joint group will congregate at the hotel and go to Palo Alto via automobile where dinner is to be served at the laboratory. A special demonstration of the 2,000-kv. equipment is being arranged by Dr. Harris J. Ryan.

**Commercial National Section to Meet.**—The second group meeting of the Commercial National Section, N.E.L.A., will be held at the Edgewater Beach Hotel, Chicago, March 9-11, 1927.

## A.I.E.E. News

San Francisco Section will meet in joint session with the P.C.E.A. Engineering Section at the Ryan Laboratory, Stanford University, Friday, Jan. 14, 1927. This promises to be the most interesting meeting of the year. Automobiles are to leave the Fairmont Hotel, San Francisco, in time to arrive at Stanford by 6 p.m. The usual dinner will be held prior to the meeting, but it will be served at the laboratory. Section members should return automobile registration cards to the transportation committee immediately upon receipt.

San Francisco Section meets Dec. 17, 1926. Dinner is planned to precede the meeting. E. M. Calderwood and J. E. Heller of the engineering department, The Pacific Telephone & Telegraph Company, will present an interesting discussion of the design and construction of a long-distance toll cable installation between the San Francisco Bay region and Sacramento.

**Student Branches.**—During the past year the student branches committee has favorably recommended to the board of directors of the institute the applications of the University of Wyoming, Laramie, and the University of Santa Clara, Santa Clara, Calif., petitioning the establishment of student branches.

## Book Reviews

### ELECTRIC TRANSIENTS

By Carl Edward Magnusson, M.S., Ph.D., E.E., author of *Alternating Currents*, professor of electrical engineering and director of Engineering Experiment Station, University of Washington; Fellow, American Institute of Electrical Engineers, and American Physical Society; Member American Society of Civil Engineers and American Mathematical Society. Second edition, 1926; 237 pages, 216 illustrations; 6 x 9 in., cloth bound, McGraw-Hill Book Co., Inc., New York City. \$3.

This second edition of this book is essentially a new book. Each chapter has been revised and brought fully up to date. One new chapter has been added. The author has given the introductory course in electric transients, as outlined in this book, to electrical engineering seniors in the University of Washington for the past 16 years. Thus the use of the material covered for text purposes has been well established.

In the opinion of the author, it is vitally essential that engineering students gain an insight into and an understanding of the basic fundamentals of engineering. Also, in his opinion, there is no question of the far-reaching importance of transient electrical phenomena in all branches of electrical engineering. His treatment of the subject of electric transients is built upon this concept and should give students a fair working knowledge of the principles involved. The text is illustrated profusely and over half of the illustrations are reproductions of oscillograms taken in the laboratory of the University of Washington by engineering students. G.R.H.

**Hydroelectric Power in Washington, Part II.—A Bibliography of Technical Papers, 1878-1925.** By Carl Edward Magnusson, professor of electrical engineering, University of Washington. This 143-page pamphlet is a sequel to Part I, published in 1924 as Bulletin No. 26. This publication should be valuable as a reference to the technical papers dealing with Washington hydroelectric developments and possibilities. This publication is known as Bulletin No. 36 and may be obtained through the Director of the Engineering Experiment Station, University of Washington, Seattle, Wash. Price 75 cents.

**Electrical Measurements and Meter Testing in the Power Station.**—By E. F. Lincoln, consulting electrical engineer, in co-operation with the engineering staff of the Weston Electrical Instrument Corporation. This 155-page publication contains engineering and operating suggestions for the standardizing and electrical laboratories of the electrical utility. It has been prepared with the idea of obtaining a manual of service and value to laboratory executives and to laboratory engineers. Various instruments, test methods and equipment are covered in detail. Published by Weston Electrical Equipment Corporation, Newark, N. J. Price 50 cents.



## News of the Electragists



### Field Secretary of N.F.P.A. to Address Inspectors

W. J. Canada, electrical field secretary of the National Fire Protection Association, has announced that he will attend the next convention of the Northwest Association of the Electrical Inspectors, Jan. 17-18, 1927, at

and to extend the geographical boundaries of the association's activity.

At the request of Mr. Canada one of the features of the meeting will be a bringing together of the standards committee on Monday night, Jan. 17, at the Multonomah Hotel, Portland, in which the convention is to be held.

**Want Ordinances Repealed.**—The Rocky Mountain Electrical Co-operative League recently filed a petition with the City Commission of Salt Lake City asking for repeal of all city ordinances respecting the licensing of electricians and installation of fixtures. The League asked for the creation of a city electrical department.

**Single-Pole Fusing.**—Announcement was made recently by Ralph W. Wiley, chief of the department of electricity, San Francisco, that beginning Jan. 1, 1927, the use of so-called single-pole fusing and switching, provided all the rules of the National Electrical Code and the electrical safety orders of the Industrial Accident Commission are complied with, will be optional in the city of San Francisco.

**Hobart Barnes**, assistant executive secretary, California Electragists, Southern Division, left for Scarsdale, N. Y., early in December. Mr. Barnes expects to bring back with him his bride, stopping off at Chicago, Detroit, Syracuse and other eastern cities to make a personal and informal investigation of conditions in the electrical contracting field in those localities.

**H. H. Walker** and **C. J. Geisbush** of the California Electragists, Southern Division, attended a meeting of the state executive committee of the California Electragists in San Francisco on Nov. 18.

**Joseph Endert**, some years ago proprietor of the Kern Valley Electric Company, has gone into partnership with **G. Jason**, and together they will run the business as the Jason Electric Company, in Bakersfield, Calif.

**Wm. Madsen** of the Janssen Electric Company of Eureka was a recent visitor to San Francisco, attending the meeting of the San Francisco Electrical Development League.

**Frank William Beyer**, electrical contractor of Denver, has recently opened a fixture display store at 3452 South Broadway.

**Holmes Electric Shop** at Pismo Beach has changed its name to **Whitlock Electric Shop**, according to recent advices.

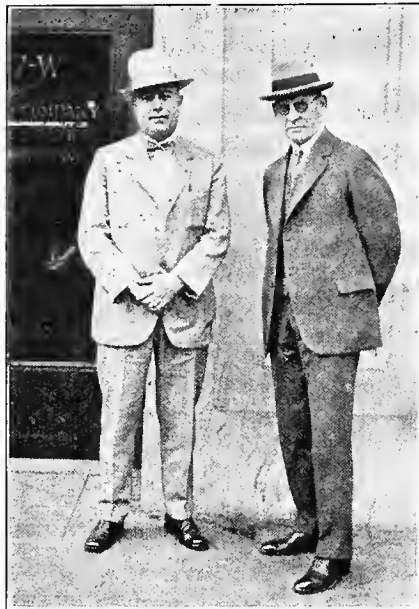
**E. P. Snyder** has entered the electrical contracting field in Redlands. He was formerly connected with the Southwest Electric Company of that city.

**L. Stinchfield**, contractor-dealer of Martinez, Calif., on Sept. 1 took into partnership **H. Glass**.

**Gerald H. Kaffer** has constructed what is believed to be the smallest electric light fixture in the world. Mr. Kaffer is a partner in the **Kaffer-Chapman Electric Company**, Denver. This is a replica in miniature of the four-candle type ceiling unit for residences. The model is two and a quarter inches in diameter, and is operated from a toy transformer on 110-volt service. The 6-8 volt flashlight bulbs are connected in multiple. Considerable newspaper and sidewalk publicity has resulted because of the display of the novel unit in Kaffer's place of business.

**John Malpiede** has been designated city electrician for Denver, Colo., to succeed **Charles Oehmler**, resigned. The appointment became effective Nov. 1. Mr. Malpiede has been connected with the city for the past eight years in the capacity of electrical inspector.

**Chas. F. Oehmler**, former city electrician of Denver, became associated with **Fred E. Staible, Inc.**, upon his resignation Nov. 1. Mr. Oehmler is a special representative for the **Erie Malleable Iron Company**, and will cover the states of Colorado, Wyoming, New Mexico and Utah.



**Frank A. Morrell** (left), city electrician, Stockton; and **H. F. Yost**, Trumbull Electric Manufacturing Company, San Francisco. Mr. Morrell is chairman of the National Electrical Code committee of the California Association of Electrical Inspectors, which receives suggested changes in the Code and presents them to the National Electrical Code committee.

Portland, Ore., and that he will address one of the meetings there.

Others speakers are being arranged for at the present time by the program committee for the convention. The entertainment committee has arranged to put on a manufacturers' show in connection with the convention which is to be educational in character. Space is being sold for the show by the committee which is under the direction of **Harry Sroufe** of Jagger-Sroufe Company, Pittock Block, Portland, Ore. A banquet and special entertainment for the ladies is being planned and members are urged to bring ladies with them to the convention. **Leonard Elder** is chairman of the program committee and requests assistance from members in getting the program arranged.

Certain articles of the association are under advisement for revision to conform with the California association's constitution. A list of these has been printed and mailed to all the members so that they may vote upon them at the time of the convention. These have to do with enlarging the membership of the association to permit industrial and supporting members



Clean company **Felix Butte**, vice-president of the California Electragists, is with **Harry Barnard** snapped him thus in confab with the laundry man.

**W. F. Blide**, Electragist, proprietor of the **Blide Electric Company**, of Santa Cruz, recently returned from a trip East. Mr. Blide is an active merchandiser in Santa Cruz and recently in co-operation with **John Holt** of the **Santa Cruz Electric Company** and **Walter Cox** of the **Cox Electric Company** staged a co-operative toaster campaign in that city.

**Hobert W. Barnes**, assistant secretary of the California Electragists, Southern Division, was in Santa Barbara and Oxnard in the interests of his organization on Nov. 16 and 17.

The **Ideal Electric Shop** operated by **C. H. Callison** and **D. W. Maty** at 1519 South Pearl Street Denver, has recently joined the Electrical Co-operative League of Colorado.

The **Electrical Supply & Construction Company**, Denver, prominent Electragists of the city, has changed its name to the **Kaffer-Chapman Electric Company**.

## Meetings

### California C.R.E.A. to Meet in Fresno Jan. 21

A meeting of the California Committee on the Relation of Electricity to Agriculture will be held in the San Joaquin Light & Power Building, Fresno, Jan. 21, 1927, according to announcement made by Prof. B. D. Moses, of the College of Agriculture, Davis, executive secretary.

Full details of the program are not yet available, but plans as developed at this time include a meeting of the executive committee at 10 a.m. and a general open meeting to begin at 1 p.m. in the convention room of the building, with music for half an hour.

This meeting is to be open not only to farmers but to central-station men, manufacturers of electrical appliances, jobbers, dealers and all others interested. At least three farmers will speak, one on dairy sterilizers, one on electric brooders, and one on electric walnut dehydrators. Each of these talks will be followed by a short discussion of the committee's investigations given by Professor Moses. A prominent representative of the Pacific Hydraulic Engineering Association will give a description of the standard guarantee form which has been adopted by that organization and by the Western Irrigation Engineering Association, and this paper then will be open for discussion from the floor. Dr. E. A. White, the national director of the Committee on the Relation of Electricity to Agriculture, also will be on the program.

A special exhibit of domestic appliances, sterilizers, brooders, motors and similar equipment will be on display in the salesrooms of the Valley Electrical Supply Company in Fresno, and this may be inspected by visitors throughout the day.

Further details of the meeting will appear in a forthcoming issue.

### Success of Red Seal Plan Object of Electrical Bureau

Continuing the policy of 1926, every effort of the California Electrical Bureau will be bent toward making the Red Seal Plan a success in 1927. This decision was arrived at at a recent meeting of the bureau's advisory committee, whose members expressed the opinion that the Red Seal Plan was of such vital importance to the welfare of the entire industry that the organization could do no better work than to use every means within its power to bring the plan to successful fruition.

The secretary reported upon the progress of the Red Seal Plan, stating that on Oct. 31 there were in California 630 Red Seal homes and that in all probability there would be between 730 and 800 by the close of the year.

Attention was directed to the fact that the full measure of work done by the bureau does not always show in the figures reported. An instance was

cited in San Francisco showing that of 25 tract builders with whom almost constant contact is maintained 14 have Red Seal homes under way at the present time and 6 have pledged themselves to make all of the homes in their tracts Red Seal. These builders have promised a total of 224 Red Seal homes, of which but 20 are in process of construction, with the result that the Red Seal report shows only 20 Red Seal homes whereas in reality as fast as the other 204 are started they automatically will become Red Seal.

The advertising committee reported that a complete advertising program had been prepared for 1927.

Attention was directed to the Red Seal advertising being conducted in newspapers throughout the United States by the Graybar Electric Company, and a motion was carried to the effect that an expression of appreciation for the valuable assistance which this advertising has lent to the Red Seal Plan be extended to that company.

### Sacramento Valley Electrical Society Elects Officers

An interesting illustrated talk on the use of the X-Ray and the different fields in which it is being used was delivered by George Mayer, manager of the Victor X-Ray Corporation of San Francisco, at the last regular monthly meeting of The Sacramento Valley Electrical Society.

At this meeting also the following officers were elected: president—J. O. Tobey, division superintendent, Pacific

### COMING EVENTS

Pacific Coast Electrical Association—  
Engineering Section Meeting  
Fairmont Hotel,  
San Francisco, Jan. 12-14

Northwest Association of Electrical Inspectors—  
Annual Convention—Multnomah Hotel,  
Portland, Ore.,  
Jan. 17-18, 1927

California Committee on Relation of Electricity to Agriculture—  
San Joaquin Light & Power Building,  
Fresno, Calif.  
Jan. 21, 1927.

Pacific Division, Electrical Supply Jobbers' Association—  
Quarterly Meeting—Hotel Del Monte,  
Del Monte, Calif.  
Jan. 27-29, 1927

Northwest Electric Light and Power Association—  
Commercial Section  
Multnomah Hotel, Portland, Ore.  
Feb. 7-8, 1927.

National Electric Light Association—  
Commercial National Section—  
Second Group Meeting,  
Edgewater Beach Hotel,  
March 8-11, 1927.

Gas and Electric Company; secretary—C. S. King, Great Western Power Company; treasurer—F. P. Brunner, Pacific Gas and Electric Company; directors, 1926-1928—R. J. Finchley, California Mechanical & Electrical Engineering Company; George C. Foss, electrical contractor; H. E. Brillhart, division manager, Great Western Power Company.

At the meeting of the society on Nov. 10 Lester S. Ready, chief engineer of the California Railroad Commission, who is to assume the presidency of the Key System Transit Company at the first of the year, spoke on "The Relation of Irrigation to Hydroelectric Development."

### Electric Heating Association of San Francisco Meets

At the second meeting of the newly formed Electric Heating Association of California held in San Francisco Dec. 1, the report of the nominating committee was handed in and unanimously accepted by the 34 members present. Officers elected were: J. L. Farley, Pacific Gas and Electric Company, president; Arthur Kempston, Apex Electric Sales Company, vice-president; and C. R. Owens, General Electric Company, secretary-treasurer.

The association was formed to fill a long-felt need for a representative body of men who would meet regularly at luncheon to discuss and work out their common problems in selling industrial, commercial and domestic heating. It is the aim of the organization to have a speaker at each meeting who will speak on some phase of electric heating that will be of mutual interest.

Mr. Farley said that it was the desire of the association to have some kind of a nickname by which it would be known to the industry locally, and he was authorized by W. W. Hicks to offer a prize of a portable air heater for the best name submitted. After informal installation of the new officers the meeting was turned over to W. J. Walsh, of the Great Western Power Company, who discussed the application of various rate schedules as they apply to the different classes of electric heating in the Bay region.

The next meeting of the Electric Heating Association is to be held in January.

### Contra Costa League Hears Talk on Red Seal Plan

Victor W. Hartley, secretary of the California Electrical Bureau, with headquarters in San Francisco, was the speaker of the evening at the recent meeting of the Contra Costa Electrical Development League held in Concord, Calif. His subject was, "What, Where, How and Why of the Red Seal Plan."

Others who spoke were Earl Alexander of Alexander & Lavenson, San Francisco; Robert Pursia, of the Westinghouse Lamp Company, and president of the Oakland Electric Club; S. V. Walton, sales engineer, Great Western Power Company, Oakland; Clark Baker, of the National Lamp Works, Oakland; A. E. Julian, of the Clark Water Heating Company; J. A. McWilliams, of the California Electrical Bureau; and George Eldridge of the California Electragists.

Educational films were shown by E. S. Bjonerud of the General Electric Company. Several vocal selections were rendered by Pope Stinchfield, dealer at Martinez, accompanied by Clark Baker, Jr., of the Fobes Supply Company.

Oakland Electric Club Hears Interesting Speech.—"The Thermionic Tube" was the subject of an illustrated talk by A. W. Copley, manager of engineering divisions, San Francisco district, Westinghouse Electric & Manufacturing Company, at a recent meeting of the Oakland Electric Club. Madame Ethel Wakefield rendered vocal selections accompanied by Charles H. Gabriel, Jr., at the piano.

## Personals

**A. G. Mott**, transportation engineer for the California Railroad Commission since November, 1923, has been appointed chief engineer of that body, succeeding Lester S. Ready, who has resigned to accept the presidency of the Key System Transit Company, Oakland, Calif. Mr. Mott was born in Minnesota in 1888 but removed to California ten years later. He was graduated from Stanford University in electrical engineering in 1908 and after a postgraduate year of study re-



A. G. MOTT

ceived the degree of electrical engineer. His early professional experience included some work in ship drafting with the Union Iron Works and some work in the mechanical and electrical departments of the United Railroads, both of San Francisco. In 1909 he was employed by the Southern Pacific Company on the work of electrifying its East Bay suburban lines in Oakland. This was followed by several years of work in various operating and engineering departments of that company. In 1921 he was employed by the California Railroad Commission as assistant engineer and two years later was appointed transportation engineer. In connection with his work with the commission Mr. Mott has conducted several important investigations relating to transportation matters, among which were an investigation of service and operating conditions on San Jose railroads, investigation of service and operating conditions on the Key System Transit Company, investigation in the matter of possible consolidation of the local lines of the Pacific Electric Railway Company in Los Angeles with the system of the Los Angeles Railway, an investigation of the steam railway terminal problem in Los Angeles and several investigations relating to auto ferry transportation on San Francisco Bay, the more important being with respect to the Southern Pacific's operations and the proposed operations of the Golden Gate Ferry Company.

**H. L. Barker**, president, Meadows Manufacturing Company, Bloomington, Ill., who has been making a business trip throughout the Pacific Coast territory, recently spent some time in San Francisco and Los Angeles.

**Roy V. Reppy**, vice-president and general counsel of the Southern California Edison Company, Los Angeles, scored a hole in one in a recent golf game at the Wilshire Country Club.

**William G. Angermann**, for the past two years instructor in electrical engineering at Cornell University, has been appointed instructor in electrical engineering at the University of Southern California. He will have charge of the work in electrical engineering courses for juniors. Mr. Angermann has had engineering experience with the Bureau of Power and Light in Los Angeles and the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

**Prof. Thomas Eyre**, for many years at Purdue University and Case School of Applied Science, and more recently dean of engineering at the University of New Mexico, has been made professor of mechanical engineering at the same university.

**Jerome A. Duffy**, formerly connected with the legal department of the Great Western Power Company, San Francisco, has opened law offices in the Standard Oil Building in that city.

**W. W. Briggs**, vice-president and general manager, Grays Harbor Railway & Light Company, Aberdeen, Wash., visited San Francisco a short time ago. From 1913 to 1918 Mr. Briggs was general sales manager of the Great Western Power Company of that city.

**Walter A. Heinrich**, formerly chief electrical engineer with the W. N. Matthews Corporation, St. Louis, has joined the staff of the Jas. R. Kearney Corporation of that city as chief engineer.

**Reuben B. Sleight**, who has been the engineer of the Minnesota Tax Commission since 1922, has accepted a position as assistant to Hebert Hoover, Secretary of Commerce. He will do research work on subjects pertaining to the electrical industry. He succeeds **Paul S. Clapp**, who resigned recently to become managing director of the National Electric Light Association.

**Mark Smith**, of E. T. Cunningham, Inc., of San Francisco, paid a visit to Los Angeles recently.

**C. C. Hillis**, vice-president, Allied Industries, Inc., San Francisco, spent some time in Los Angeles not long ago.

**H. J. Mauger**, assistant to the president of the Edison Electric Appliance Company, Chicago, has been elected chairman of the Heating Device Section of the National Association of Electrical Manufacturers.

**R. W. Turnbull**, Pacific Coast district manager, Edison Electric Appliance Company, whose headquarters are in San Francisco, recently made a trip to Seattle on business.

**F. V. Boller**, stock sales manager, San Joaquin Light & Power Corporation, Fresno, Calif., is head of the N.E.L.A. educational course which fifty-one employees of that company and the Midland Counties Public Service Corporation have enrolled for.

**V. L. Board**, general superintendent of the Public Service Company of Colorado, will head the new industrial development committee of the Denver Chamber of Commerce, according to a recent announcement. The purpose of this committee's program for the current year is to bring to completion a plan to create a loan fund for the financing of new industries for Denver.

**H. P. Wilson**, president of the Western Power Corporation, New York City, holding company of the Great Western Power Company of California and the San Joaquin Light & Power Corporation, a short time ago paid a visit to the Pacific Coast. While in San Francisco Mr. Wilson was the guest of **J. B. Black**, vice-president and general manager of the Great Western company.

**Gaskell S. Jacobs**, formerly valuation and rate engineer, San Joaquin Light & Power Corporation, Fresno, Calif., has announced his resumption of the general practice of consulting engineering, with offices in the Balfour Building, San Francisco.

**Elmer A. Sperry**, for many years a prominent figure in the electrical industry, has been awarded the John Fritz gold medal for 1927 for the development of the gyro-compass and the application of the gyroscope to the stabilization of ships and airplanes. Mr. Sperry, who is now president of the Sperry Gyroscope Company of New York, in 1880 founded the Sperry Electric Company of Chicago, which manufactured arc lamps, dynamos, motors and other electric equipment. Three years later he erected on Lake Michigan the highest electric beacon then known, about 350 ft., and equipped it with arc lights to the extent of 40,000 cp. In 1888 he was accorded the distinction of having been the first to produce electrical mining machinery. Soon after his first successes in that field he founded the Sperry Electric Railway Company of Cleveland to manufacture railway cars, and continued that business successfully until 1884 when the General Electric Company purchased the patents. Mr. Sperry first turned his attention to the gyroscope about thirty years ago. He invented the first successful gyro-compass, and in 1910 organized the Sperry Gyroscope Company for the



ELMER A. SPERRY

manufacture of the gyro-compass, ship and airplane stabilizers, highest-intensity searchlamp, fire-control apparatus, airplane and navigational and similar equipment. Mr. Sperry was one of the founders of the American Institute of Electrical Engineers and of the American Electrochemical Society and was chairman of the committee that called the first meeting of the National Electric Light Association. He is a member of many other technical and engineering societies and the holder of more than four hundred patents on mechanical and electrical devices.



**E. T. Ward** is secretary and credit manager of the new Fobes Supply Company of Montana, with stores in both Spokane, Wash., and Butte, Mont.

**Ernest Smith** has been made sales engineer for the Allis-Chalmers Manufacturing Company in the Oruro, Bolivia, office. This is a branch of the company's district office in Santiago, Chile.

**Charles R. Boggs**, factory manager of the Simplex Wire & Cable Company, Boston, recently sailed from that city on a two months trip to Europe.

**W. P. Swartz**, Pacific Coast representative for the Standard Electric Stove Company, with headquarters in Los Angeles, recently made a trip through the Northwest and Alaska.

**Terrill T. Taylor**, division engineer, Twin Falls division, Idaho Power Company, has resigned to accept a position with the engineering department of the Cement Gun Company, Chicago. **D. H. Tarleton**, formerly of the company's American Falls power station, succeeds Mr. Taylor.

**A. G. Wishon**, president, San Joaquin Light & Power Corporation, Fresno, Calif., recently celebrated his seventy-sixth birthday. In honor of the event a dinner party was given at Balch Camp.

**W. R. Bell**, formerly sales manager of the El Paso Electric Company, El Paso, Texas, has been made superintendent of light and power of that company, succeeding C. F. Terrell, who has been promoted to the position of general superintendent of light and power for the Tampa Electric Company, Tampa, Fla. Both companies are Stone & Webster properties. Mr. Bell became head of the El Paso sales department about two years ago and during his administration paid particular attention to the merchandising efforts of the company, with especially successful results. He has been identified with Stone & Webster companies for the past twenty years, his first



W. R. BELL

position having been with the Paducah Electric Company, Paducah, Ky., while he was still attending school and working in his vacation periods. The year following his graduation from Rose Polytechnic Institute, Terre Haute, Ind., in electrical engineering in 1912, he was made assistant superintendent of the Baton Rouge Electric Company of Baton Rouge, La., and later became sales manager. In 1920 he joined the organization of the Haverhill Gas Light Company, Haverhill, Mass., as sales manager, remaining there until 1924 when he was transferred to El Paso.

**V. G. Shinkle**, secretary-treasurer, The Washington Water Power Company, Spokane, recently visited Chicago, St. Louis and Denver.

**J. E. E. Royer**, assistant general manager, The Washington Water Power Company, Spokane, attended the recent national convention of the American Electric Railway Association at Cleveland.

**W. B. Rittenhouse**, hydroelectric engineer, Byllesby Engineering & Management Corporation, who has been spending some time at the El Dorado project of the Western States Gas & Electric Company, Stockton, Calif., paid a visit to San Diego not long ago.

**Jack Shay** is the new sales manager of the Reiman Wholesale Electric Company, Los Angeles.

**E. N. Simmons**, of the Los Angeles Gas & Electric Corporation, has been named auditor of that company's Employees' Mutual Disability Fund.

**Wigginton E. Creed**, president, Pacific Gas and Electric Company, San Francisco, played an important part in the western divisional meeting of the United States Chamber of Commerce held in Colorado Springs Dec. 6-7. Mr. Creed was the principal speaker at the session dealing with western industrial development, in which he discussed the relationship of agriculture to industry in the eleven Western states.

**Oswald Lewis** and **D. C. Perkins**, of the Lewis-Perkins Sales Company, Inc., Salt Lake City, accompanied by **A. E. Wilson** of the same organization, recently paid a visit to San Francisco. During their sojourn they were guests at one of the meetings of the Illuminating Engineering Society.

**Carl Pierce**, of Hubbard & Company, Pittsburgh, was a recent visitor in San Francisco.

**R. E. Fisher**, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, San Francisco, spoke on "The Development of Aviation as a Commercial Enterprise" at the closing session of the fourth midyear meeting of the Western Division of the Chamber of Commerce of the United States held recently at Colorado Springs, Colo.

**G. M. Eaton**, formerly chief mechanical engineer of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, has resigned to join the Molybdenum Corporation of America in a sales engineering capacity. Mr. Eaton entered the employ of the Westinghouse company in 1906 after serving for some years with the Newport News Shipbuilding & Drydock Company in the East and the Union Iron Works in San Francisco.

**George Bakewell, Jr.**, executive manager of the Electrical League of Colorado, Denver, recently spoke before the Colorado Engineering Council in that city on "Artificial Light." Mr. Bakewell also spoke over the General Electric Company's radio station KOA on "Holiday, Home and Commercial Lighting" as a tie-in with the annual Christmas outdoor lighting contest sponsored by the league.

**Edwin M. Burgess**, retiring vice-president and director of the Mountain States Telephone & Telegraph Company, Denver, was given a testimonial dinner recently in recognition of his record service of forty-five years with the company. Mr. Burgess entered the service as an operator in Pueblo at the age of 18 years.

**Ellery W. Stone**, for more than two years president of the Federal Telegraph Company, San Francisco, has been made president of Federal-Brandes, Inc., a corporation recently formed through the merging of the Federal Telegraph Company with the Brandes Products Corporation and affiliated Brandes companies in Canada and England. Mr. Stone is well known in the electrical industry and his experience with radio matters covers a wide field. For three years, from 1914 to 1917, he was United States radio inspector for the sixth radio district in San Francisco. For the next two years he was district communications superintendent of the eleventh naval district with headquarters in San Diego, Calif., and in 1919 became California manager for



ELLERY W. STONE

**Kilbourne & Clark Manufacturing Company** and its subsidiary, **Ship Owners' Radio Service, Inc.**, in charge of the Los Angeles and San Francisco offices. From 1920 to 1922 Mr. Stone held the position of general manager of Moorehead Laboratories, and then in the latter year, at the request of officials of the southern Chinese government, he made a survey of the radio situation in China, particularly in the south. In May, 1922, Mr. Stone joined the staff of the Pacific States Electric Company, San Francisco, as sales manager of its radio department, a post he resigned two years later to become president of the Federal Telegraph Company. In his new position as president of Federal-Brandes, Inc., Mr. Stone's headquarters will be in San Francisco.

**H. A. Rands**, formerly construction engineer for the Portland Electric Power Company, has returned to the United States after spending a year in Nome, Alaska, for the U. S. Smelting, Refining & Mining Company. He has joined the organization of The Washington Water Power Company, Spokane, Wash., in connection with the Lake Chelan hydroelectric development.

**R. B. King**, general superintendent, **J. D. Orr**, division manager, and **Kinsey Robinson**, division engineer, all of the Idaho Power Company, Boise, recently paid a visit to Baker, Ore., in connection with the purchase of the Cornucopia Mines Company line.

**Richard S. Rubincam**, local manager, Mine & Smelter Supply Company, Denver, and **Joseph E. Morehead**, assistant director of publicity, Mountain States Telephone & Telegraph Company, of that city, are staff members of Denver's Community Chest.

## TRADE NOTES

Edwin L. Wiegand Company, 422 First Avenue, Pittsburgh, has issued Bulletin C-106, "Chromalox Heating Units for Industrial and Commercial Applications." The booklet contains detailed information on Chromalox electric strip heaters, electric space heaters, electric ring units and electric immersion heaters. The back cover is devoted to electric heat engineering data. The company also has issued Bulletin C-108, "For Heating Hard-to-Heat Places," giving concise and tabulated information on its horizontal, portable and vertical types of electric heaters.

General Radio Company, 30 State Street, Cambridge 39, Mass., has issued "General Radio Precision Apparatus," a collection of previously issued bulletins. The book contains Bulletin 925 on quality apparatus and other bulletins on transformers, transmitting and receiving sets, bridges, meters and numerous other radio apparatus.

The National Carbon Company, Inc., New York City, with western branches in San Francisco, Los Angeles, Seattle and Portland, is exhibiting at the Sesquicentennial Exposition at Philadelphia what it claims to be the biggest flashlight in the world. This huge flashlight, measuring 6½ ft. in length and 2½ ft. in diameter, is an exact working reproduction, on a gigantic scale, of one of the popular models manufactured by the company. It is powered, however, from the electric lighting system of the exposition and has a 2,000-watt lamp.

The Standard Underground Cable Company, Seventeenth and Pike Streets, Pittsburgh, recently has developed a new line of high-voltage oil-filled terminals, making use of the barrier type of construction invented by R. W. Atkinson, chief electrical engineer of the company, a few years ago. The fundamental idea underlying the design of these terminals is the use of an oil-filled metallic shield joined to the end of the cable sheath and flaring from the cable diameter in such a way as to relieve the excess stresses occasioned at the end of the sheath, and accomplish a redistribution of stresses favorable to high resistance from breakdown of the terminal either from puncture or flashover. Three sizes of terminals have been developed for use on working voltages of 75 kv., 110 kv. and 132 kv., respectively. The general construction and appearance is the same for all voltages.

The Ohio Brass Company, Mansfield, Ohio, recently started construction work on its new administration building in that city to provide much needed, larger working quarters. The new office building will cost approximately \$500,000. It is to be a five-story steel and brick structure with stone trim, 255 x 52 ft., and having reinforced concrete floors. Construction will be fireproof throughout. The general layout and appointments will compare favorably with the finest factory office buildings erected in recent years, according to the company.

George Richards & Company, Inc., 557 West Monroe Street, Chicago, have placed on the market a radio tube tester to be known as the Hemco Radio Tube Tester. Two distinct types are ready for distribution at the present time, one for 201-A tubes UV or UX, and one for UV-199 type tubes. This tube tester operates from the radio set power supply. A double lead wire (brown) is connected one lead to A+, the other to A—, while the single lead wire (maroon) is connected to the 45-volt B.



Here's a lucky picture—just full of horseshoes. John Bray, credit manager of the Graybar Electric Company, San Francisco, has just tossed the equine footgear, which accounts for the exhibition of esthetic dancing which he seems to be giving. And now Al Nicoll, sales manager for the same company, with skillful hand and steady eye, measures the distance to the stake, takes careful aim—and hopes to make a ringer. (Those terms are correct. Joe Thieben, of the Panama Lamp & Commercial Company, expert horseshoe pitcher, says so.) By the way, does anybody know who the pretty little dryad is?

The Mutual Electric & Machine Company, 7610 Jos. Campau Avenue, Detroit, has issued Bulletin 107 which combines under one cover several loose leaf bulletins already published separately. The material deals with "Bull Dog" Fusenters, "Safto Fuse," and other Bull Dog electrical products used in buildings.

Link-Belt Company, 910 South Michigan Avenue, Chicago, has placed on the market its new ball-bearing vibrating screen. The low upkeep expense necessary in the use of this screen and its wide adaptability for the exact and careful screening of an exceedingly large number of materials are among the advantages of this product, according to the company's announcement.

The Willard Storage Battery Company, Cleveland, Ohio, has adopted a comprehensive program of group insurance benefitting over 2,000 of the company's employees, located in more than twenty cities of the United States and Canada. Included in the plan are life insurance, health and non-occupational accident coverage and accidental death and dismemberment protection. The life insurance will reach a total of approximately \$3,000,000, while the accidental death and dismemberment insurance will amount to about \$1,000,000.

The Esterline-Angus Company, Indianapolis, Ind., has compiled Bulletin 1026, "New Uses for Graphic Meters." The uses cover the recording of the performance of automatic stations, recording hydraulic pressures, Esterline-Angus instruments in radio telegraph stations, and station records in uptown offices.

The New Departure Manufacturing Company, Bristol, Conn., has issued through its engineering department a booklet, "Cutting your Costs, or What New Departure Ball Bearings Mean in Your Motor." It contains detailed figures comparing the cost of operating with non-ball-bearing motors with that of operation with ball-bearing motors and enumerates other points of advantage of New Departure ball bearings.

The Wiremold Company, Hartford, Conn., has announced its new "Slick-Finish" loom, which, it claims, eliminates the cause for complaint when used for rewiring and extension jobs in residences, as there will be no mica dust floating over the premises and getting into rugs, draperies and other furnishings.

Roller-Smith Company, 233 Broadway, New York, has issued Bulletins No. 110 and No. 150, covering respectively its new type HTD and HTA instruments. The HTD instruments in Bulletin No. 110 comprise direct current ammeters, voltmeters and volt-ammeters. The HTA instruments in Bulletin No. 150 comprise alternating current ammeters, voltmeters and single-phase wattmeters. The outstanding features of these new instruments are that they are small enough for the pocket, tool kit or traveling bag; are accurate enough for all ordinary sets, rugged enough to withstand extremely hard service, are light in weight, very compact and of good appearance. Complete detailed information is given in the bulletins.

Roach Appleton Manufacturing Company, 3440 North Kimball Avenue, Chicago, is adding the following new lines to its lists: Steel fish wire, ⅜, 3/16 and ¼ in. wide in both .030 and .060 thickness, each coil packed in a labeled carton; concrete boxes and plates—all sizes; utility boxes and covers—the full line; gang switch boxes and covers—full line, both regular and shallow depth; tandem switch boxes; no-bolt fixture studs; locknuts and bushings; connectors and hickey type fixture studs.

The Laube Electric Company, Rochester, N. Y., has adopted a plan of co-operative group insurance that, in addition to the life protection offered, provides the advantages of a health and non-occupational accident policy carrying liberal weekly benefits. The life insurance alone exceeds \$60,000. Included in the program is a visiting nurse service.

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